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A COMMENTARY ON THE LAWS OF BOTANICAL NOMENCLATURE

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1. Introduction

Since the main object of the International Rules of Botanical Nomenclature, ed. 3 (1935) is to ensure simplicity and finality in the names and to prevent more than one interpretation to a given name sensu stricto, it is unfortunate that there should exist a good deal of misconception and dissatisfaction over the Rules. But, for the existence of this state of affairs, the Rules

themselves cannot be entirely exonerated from blame. The terms valid and legitimate with their respective derivatives, which have a great importance in botanical nomenclature, have been defined and used equivocally in the Rules; and some nomenclatorial points, where definite instructions are absolutely needed to avoid confusions and equivocations, are left ambiguous. The result is that practices contrary to the spirit of the Rules seem admissible under the letter of the Rules. Already in a small footnote in the GARDENS' BULLETIN, S.S. Vol. VIII, 1935, p. 341, I first drew the attention of botanists to the need of making a clear distinction between the two terms, legitimate (=legal) and valid. In the same publication (l.c. p. 336), I pointed out the necessity of prohibiting the acceptance of a newer interpretation of a name, the type of which is not extant, without showing any adequate botanical reasons for the rejection of earlier interpretation. But as the nomenclatorial laws are of very great importance to systematists, and as in neither of my previous communications have I developed my ideas on the subject to any great length, I make no apology to revert to it here.

2. Definitions of the Terms Valid and Legitimate

A name of a taxonomical group is invalid because certain factors existing in the name itself, or in its botanical description, or in the circumstances affecting the publication of the book or periodical in which the name is published, violate the Rules; that is, the name does not satisfy the conditions prescribed as basic for the words constituting the name, for the words or references constituting its taxonomical description, for the nature of the book or periodical wherein it is published, or for the means taken to make the name known to systematic botanists. Failure to comply with the basic conditions prescribed in the Rules makes a taxonomic name invalid; that is, it does not count, and has no status, in systematic botany; and as such it should not be listed in works like INDEX KEWENSIS.

Examples of invalid names are all nomina nuda; tautonyms; names published since January 1st, 1935, without Latin diagnosis; or published before the starting points prescribed in Art. 20, or in an ineffective publication; names which cannot be considered as belonging to the binomial system; etc. All such names may be conveniently classed as NOMINA INVALIDA.

Taxonomic names that satisfy every one of these conditions are valid; and as these are the only ones that count in systematic botany, they must all be registered in works like INDEX KEWENSIS. Valid names, however, may have been published in violation of another set of conditions or laws that have nothing in common with those mentioned above, and which may be termed secondary or accessory. These conditions are laid

down with the object of ensuring uniformity and finality in the valid botanical nomenclature so as to render it more easily followed by the interested public, without, at the same time, losing the trend of the history of the individual group from its earliest valid origin. Valid names that satisfy all these accessory conditions are legitimate, while those that do not satisfy any one of these conditions are illegitimate.

Though several names may have been validly proposed for a given taxonomic group (*i.e.* a group in a given sense, in a given position and in a given rank), the secondary rules make it impossible for the group to bear more than one legitimate name and regard all the other rival names as illegitimate. Hence an author, having defined his taxonomic group and assembled together all the rival names of the group, should consult the accessory rules in finding out the correct, that is, the legitimate, name for his group. Should opinions differ on a given taxonomic group with regard to its limits, rank or position, so as to permit it being regarded as one according to one opinion, or as two of the same rank, or as one of a different rank, according to another, then an illegitimate name to one botanist will become a legitimate name to another, and *vice-versa*. The main object of the Rules is, therefore, not to interfere with the taxonomic opinions of botanists, but to instruct them as to which of the existing names or epithets should be legitimately used for a given taxonomic group in a given sense, or what conditions should be complied with in order that a certain name may be admitted first as valid and then as the legitimate.

Illegitimate names owe their origin: to their authors' ignorance of the previous systematic work on the subject; to the wrong supposition that the previous illegitimate names are invalid; to faulty judgement or to differences of opinions about the limits of the taxonomic groups involved; to misinterpretation of previously published names; to oversight when in one and the same work the same name is adopted for more than one species, or more than one name for the same species; or also to special decisions of the Congress against the oldest validly published names that are not later homonyms.

Unlike the invalid names, illegitimate names cannot be disregarded in systematic botany, but, like the legitimate names, must be registered in INDEX KEWENSIS, because they effectively preclude one from applying them again legitimately to another and later taxonomic group of equal rank; and also because their status is often a matter of taxonomic opinion so that, as said above, an illegitimate name to one botanist may be legitimate to another. Illegitimate names constitute the synonymy of the legitimate names, and, when cited as such, serve to show how, and possibly, why, the nomenclature of each

individual group has undergone a series of changes from its earliest valid origin as well as to indicate how the opinions of the botanists, who cite them, differ from those of others on the same subject.

Later names of a taxonomic group and later homonyms, if not conserved, are illegitimate. The following two examples may be cited to illustrate the point in question:

(*a*) *Desmos chinensis* Lour. (1790) was published simultaneously with *D. cochinchinensis* Lour. (1790), but the author himself thought them to be doubtfully distinct and suggested the possibility of the former being a variety of the latter. Though there are botanists who regard the species as distinct, in which case both names are legitimate, there are other botanists who consider the species as specifically equivalent. As the names are of the same age, it becomes difficult to decide in this case which of the two should be regarded as illegitimate and which legitimate. The new Rules prescribe to follow the botanist who first decided on the matter; and as in this case it happens that the botanist, who was first to consider these two species definitely as equivalent, had cited *D. chinensis* Lour. as a synonym of the other, *D. chinensis* will have always to be considered as illegitmate whenever it is regarded as being identical with *D. cochinchinensis* Lour.

(*b*) The next example is of two valid genera, the oldest of which is arbritarily made illegitimate by the decisions of the Congress: *Homalocenchrus* Meig. (1760) and *Leersia* Swartz (1788) were published independently, but based on the same type species *Phalaris oryzoides* L. Here though the first name is older of the two, the second is conserved by the Rules and is made thereby legitimate for the group. But as this conservation makes the first name only illegitimate and not invalid, the name *Homalocenchrus* cannot be legitimately used for any other genus in which the type species *Phalaris oryzoides* is not included. In such cases as this there is also the possibility of future decisions reversing the previous ones and making legitimate what is now illegitimate, and *vice versa*.

In order to follow the Rules better, therefore, read: LEGITIMATE for Valid in Arts. 16 and 58; ILLEGITIMATE for illegitimate in Arts. 60 (1-partly), 60 (3), 61, and 69 (partly); VALIDLY for Validly in Arts. 19, 37–40, 42, 45, 48 and 58; VALIDATE for Validate in Arts. 41 and 43, VALID for legitimate in Arts. 20, 45, 56, 60 (2), and 69; VALIDATE for legitimize in Art. 38; INVALID for illegitimate in Arts. 2 (partly), 60 (4–5), 67 and 68; using VALID and LEGITIMATE with their respective derivatives as defined in this paper; though, to make the Rules precise and unequivocal, it would be necessary to state the Rules afresh, changing completely the sections into which they are divided and the order in which the Articles are arranged.

Articles affecting the validity of the names of taxonomic groups are Arts. 19, 20, 36–44, 45 (partly), 59 (partly), 60 (4–5), 67 and 68. All the remaining Rules [*i.e.* Arts. 21–35, 45 (partly), 46–58, 59 (partly), 60 (1–3), 61–66 and 69–74] and Art. 16 (partly) affect the legitimacy.

3. Kinds of Invalid Names, and Nameless Taxonomic Groups

Botanical legislators will do well to recognize the following kinds of invalid names, as such a recognition will make the nomenclatorial laws more precise and unambiguous :—

I. *A name in an ineffective, and therefore invalid, publication.*

Botanically ineffective publications are those that are published in contravention to Art. 36.

In my opinion here should also be included all those publications that ordinarily do not reach systematic botanists *e.g.* modern Encyclopedias and Dictionaries on gardening and on the uses of plant products; seed-lists, seed-catalogues; non-botanical and non-systematic periodicals and books; botanical and systematic books meant to be used as text-books for schools, colleges, etc. As a decision making non-botanical, and non-systematic books and periodicals systematically ineffective may have undesirable effects, time should be fixed (say January 1st, 1941) after which such publications would be considered ineffective.

II. *A name in an effective, but invalid, publication.*

In this class will come all botanical works that have been effectively published, but which, owing to the starting points fixed in Art. 20, cannot be taken into account for systematic purposes; or such works published after the starting points, but where the binary system is not consistently followed throughout, cf. Art. 68 (4).

Should any one in future publish any systematical work without adopting in it the binomial system, that work should, in my opinion, be regarded not only as invalid but also as ineffective, so that it would not be possible to validate new binomials by referring to the descriptions in such works.

The question of validity and effectiveness of works of early modern authors not following consistently the binomial system is *sub judice*, a Committee having been appointed by the last Congress to investigate this matter.

III. *A name in an effective and valid publication.*

Such a name may fall into any one of the following categories :—

(*a*) A validable name but without adequate systematic, or with invalid, description :—

1. A name without any botanical description or without a reference to another effectively published description or plate.
2. A name without a description, but with references not admitted by the Rules.

3. A name with a description, but not in the language prescribed.

(*b*) A validable name with adequate description or references but proposed for adoption in the future should certain expectations come true. Such a description should in my view be regarded as a non-validable description. (Provisional names).

(*c*) A non-validable name but with a valid description (*i.e.* a description that would have been valid had the name been also valid).

1. A name not intended by the author to be a taxonomic name cf. Arts. 67 (1) and 68 (1–2); or coinciding with technical terms to be rejected under Art. 67 (2).

2. A name not belonging to the binary system published as an exception in a book where the binary system is consistently employed cf. Art. 68 (4).

3. A name belonging to the binary system, but a tautonym.

IV. *Nameless Taxonomic Groups.*

This class includes all those taxonomic groups which, though recognized as new and accompanied with valid descriptions, are published without any vernacular or scientific names. They are sometimes separated with difficulty from the Class III-c (1). Such species are sometimes distinguished by the terminology "Species No. I", *"Calamus* cf. *anomalus"*, *"Calamus anomalus?"*, etc.

Failure to grasp these distinctions by the legislators has caused much confusion regarding the proper attitude to be taken towards these invalid names. It is a general, though not apparently universal, custom not to validate a taxonomic name by referring to invalid literature, or to the descriptions of invalid names in valid literature, exception being made to plates and figures in effective but invalid literature in Class II and to valid descriptions in Classes III-c (1–3) and IV and also to species in Linnaeus's *Species Plantarum* ed. 1 and 2. Where reference has been made to a description in an effective but invalid botanical publication (Class II), it has been customary to take this as a reference to the type specimen of the invalid species.

I think a great number of Nomina ambigua, confusa vel dubia would disappear if all botanists were to adopt this attitude in interpreting a name validated by references to effective but invalid publications. References to invalid literature or species do not produce a new isonym (*vide infra* for the definition of this term, section 5), but a new species. Hence despite the citation of an invalid name and even the adoption of its trivial epithet,

the author can, if he likes, choose as the type of his species any specimen, even one that is not included in the invalid references cited, provided the specific description is drawn from it.

Owing to the unintentional omission of significant words, Arts. 37, 42, 43 and 44 of the Rules seem to permit validation of names of taxonomic groups by referring to any sort of invalid names other than nomina nuda, provided the reference has satisfied the conditions imposed in Art. 36 for its effectiveness; while Arts. 43 and 44 seem to admit references to plates invalidly but effectively published. This means that one can validate a name of a species or genus by merely referring to plates (issued before 1908), and descriptions, that have appeared in popular, non-systematic and non-botanical books or periodicals, or to species that have been published after 1934 without any diagnosis in Latin, provided the periodicals and books have complied with the conditions laid down for the effectiveness of their publication.

Such a procedure, if admitted as valid, would violate the very spirit with which the Arts. 37–44 have been inserted in the Rules. In fact I think that it would be to the advantage of systematists in general if, henceforward, only citations of valid species, or of invalid names but with valid descriptions in Class III-c and Class IV should be permissible references for validating a name of a taxonomic group; in future all references to any other invalid names or descriptions, even those in Class II to which reference has been permitted, should be made invalid.

This defect in the Rules can be remedied by inserting the word *validly* after *effectively* in lines 3 of Arts. 37 and 44, and in line 2 of Art. 42; and the word *effectively* before the last phrase *before January 1st, 1908* in Arts. 43 and 44; as well as by taking the word *effectively* in the sense suggested under invalid names of Class I and Class II. But should there be any objections to give the word *effectively* the sense proposed above, it is necessary to define *valid publications* as being those that ordinarily reach systematic botanists, a provisional exception being made to periodicals like the Indian Forester, *Journal of Royal Asiatic Society, Malayan Branch, Gardeners' Chronicle,* etc. which are not purely botanical periodicals. But publications, which their titles indicate to be purely zoological, ethnological, geological, medicinal, etc. and which should therefore have nothing to do with systematic botany, or which belong to the class of modern dictionaries and encyclopedias on gardening or plant-products, botanical text-books for schools and colleges, and seed-lists, should, for the purpose of systematic botany, be declared invalid, even when they are effectively published. It would then be a very simple matter to rule out as invalid all taxonomic names published in invalid publications, as well as such as have been published merely by references to descriptions or figures in invalid publications. A ruling like this would, for

instance, invalidate the alga, *Rhopalodia vermicularis* O. Müll forma *recta* Fl. Rich in Journ. Linn. Soc., Zoology, XXXVIII (1933) 262.

The Rules are ambiguous as to the status of the names published in the direct contravention of Arts. 54, 59 and 69, so that it is not possible to decide whether the names thus published are valid but illegitimate, or invalid. In this matter Art. 60 is also ambiguous (*vide* my remarks in Section 6, p. 235). A definite ruling on this matter is necessary as it affects the status of homonyms and consequently the legitimacy of certain names rejected as later homonyms.

4. Provisional Names

A new amendment made to the Rules at the last Congress (1935) regards provisional names as invalid, but no adequate description or examples are given to show exactly what a provisional name is. The clause regarding the provisional names reads as follows:—"A name of a taxonomic group is not validly published unless it is definitely accepted by the author who published it. A name proposed provisionally (nomen provisorium) in anticipation of the eventual acceptance of the group, or of a particular circumscription, position, or rank of a group, or merely mentioned incidentally is not validly published".

Now the effect of the first sentence of this decision will have far reaching results, and, if put into practice, may produce chaos and confusion, requiring a lengthy list of nomina generica et specifica conservanda.

(1) *Epipremnum humile* Hook. f., *Fl. Brit. Ind. VI* (1893) would become invalid because of the author's following remarks on the genus: "This genus [*Epipremnum*] had better be merged in *Rhapidophora*."

(2) *Plectocomiopsis dubius* Becc., which has been described at some length in *Ann. Roy. Bot. Gard. Calc. XII* (1918) 56, will suffer the like fate because of the following observations: "It is a very imperfectly known and doubtful species,————We may even suppose that *P. dubius* represents a juvenile stage of *P. Wrayi*————In conclusion, *P. dubius* established on Ridley's n. 12119 must be considered as yet as a doubtful species, but not certainly referable to *P. geminiflorus* as has been stated by Ridley————".

(3) *Desmos chinensis* Lour. will cease to have any valid status because the author had added to the description the following words: "fortasse illius varietas".

In each of these cases, the author may be interpreted to mean that there are reasons to doubt the delimitation of the genus or species concerned, but that he leaves the subject to future botanists, whose attention he wishes to draw by his remarks. At present he is content with the names he has adopted and described.

A parallel case is also of *Cyrtophyllum? lanceolatum* DC. *sp. nov.* Prodr. IX (1845) 31. Here the author means that he is pretty sure that the species as represented by the specimen he has

described is a new species; and that though his material is either aberrant or insufficient to say definitely whether it belongs to *Cyrtophyllum* or to any other closely allied genus, the author assigns it to the genus *Cyrtophyllum:* Let the future investigators transfer the species to another genus if they disagree with his disposition.

If botanists are to reject the above species on the plea that the author in each case did not accept definitely the genus or species, then this rejection is going to create a very bad precedent which, as said above, will have to end in a creation of a lengthy list of nomina generica et specifica conservanda to prevent chaos and instability in nomenclature.

Similarly I consider that the name *Neurotecoma* K. Schumann is validly published, though the author considered the material at his disposal insufficient for a thorough investigation. If it is invalid, as proposed in Briquet's *Recueil Synoptique* p. 41, 1930, and declared by the last Congress (1935), because of certain words contained in its description, then *Spirotecoma* Baill. *ex* Dalla Torre et Harms is also invalid because the last two authors did not make any exclusion from Schumman's description, but meant that *Spirotecoma* Baill. was synonymous with *Neurotecoma* Schum. Further, as explained above, the practice of validating a name by referring to an invalid description, or to a description that, though published in a valid publication, does not belong to Class III-C and Class IV, is not supported by usage and therefore needs condemning. If in the description or remarks there were certain words that made the genus *Neurotecoma* invalid, the words were not excluded by Dalla Torre and Harms in their citation. Had they described the genus, then the description, and not the citation, would have validated the genus *Spirotecoma.*

A parallel may be found in the case of nomina confusa. If a nomen confusum is used as a basinym without showing exactly what portions from the description and what specimens are to be excluded from the basinym*, then its isonym* becomes also a nomen confusum. If this interpretation of the provisional names is not accepted, then it will be possible to validate a name by referring to an invalid description; and it will also mean that invalid provisional names will become valid by merely registering them in works like the *Index Kewensis.*

According to my view, the names in the following sentences are invalid and cannot be used as basinyms:—

(1) "If this section [*Mesembryanthemum* sect. *Minima Haw.*] proves to be a genus, the name of *Conophyton* would be apt" (Haworth, *Rev. Gen.* 1821 p. 82).

(2) "The anther-appendage is analogous to that of *Doryphora;* consequently this *Eupomatia* [*E. Belgraveana* F. Muell.] might subgenerically or perhaps even generically be separated (as *Himantandra*)" (*Australas. Journ. Pharm.* Jan. 1887). (cf. also Alternative names).

* These terms are explained on p. 233 under exact synonyms.

(3) Should Beccari's supposition that *Ptychosperma angustifolium* Bl. is identical with *Coleospadix oninensis* Becc., accord with actual fact, then *Coleospadix angustifolius* (Bl.) would be the correct name (hypothetical case).

(4) I make the new combination *Coleospadix angustifolius* (Bl.) to be used instead of *C. oninensis* Becc., should Beccari's surmise that this species is identical with *Ptychosperma angustifolium* Bl. turn out to be correct (hypothetical).

(5) If Curtis's specimen from Penang proves to represent a species different from *Pothos Maingayi* Hook. f., then it might be called *P. Curtisii*. The latter may be described or distinguished as follows :—.....(hypothetical).

But if, instead, a different wording was used so that not the adoption, but the rejection, of the names proposed was made dependent on future investigations, I think the names could be regarded as valid, and could be used as basinyms for making new binomials. These sentences (1)–(5) might be turned in this way so as to validate the new names :—

(1) I think this section should be raised to a generic rank. I propose to name it *Conophyton*. [In this case *Conophyton* Haw. would have been an alternative name to *Mesembryanthemum* sect. *Minima* Haw. See below my remarks on alternative names].

(2) *Eupomatia Belgraveana* F. Muell. is so distinct that it would be better, I think, to make it the basis of a new genus *Himantandra*. The anther-appendage of this species is analogous to that of *Doryphora*, and differs from other Eupomatia species————.

(3) Beccari thinks that *Coleospadix oninensis* Becc. is identical with *Ptychosperma angustifolium* Bl. Though this cannot now be proved beyond all doubt, for there is no type specimen of the latter, I think it is better to follow Beccari in this matter. I therefore make the new combination *Coleospadix angustifolius* (Bl).

(4) On the supposition that Beccari's opinion is correct that *Coleospadix oninensis* Becc. and *Ptychosperma angustifolium* Bl. are the same species, I make the combination *C. angustifolium* (Bl). to be used as the legitimate name for *C. oninensis* (Becc.).

(5) Curtis's specimen resembles *Pothos Maingayi* Hook. f. so very closely that I hesitate to describe it as specifically different, but flowers are more than twice as large as in that plant,————. I name it provisionally as *Pothos Curtisii* Hook f. Further studies might show it to be a mere form or variety of *P. Maingayi*.

or : this specimen, though it resembles very much *Pothos Maingayi* Hook. f., might be specifically separated under the name *P. Curtisii*, for it differs from *P. Maingayi* in————.

5. Kinds of Illegitimate Names or Synonyms

Some botanists have tried to subdivide illegitimate names or synonyms of a taxonomic group into names that are valid (or legitimate) and invalid (or illegitimate). But they have been unable to dissociate from these terms also the sense given in this paper and have succeeded in creating a great deal of confusion and equivocation on the matter; and as the Rules of Nomenclature have not escaped from these confusing notions, it seems useful before proceeding further to pause a while and inquire into the

exact nature of the three main classes into which synonyms may be subdivided :—

1. ABSOLUTE OR EXACT SYNONYMS are illegitimate names based on the same specimen, or a duplicate from the same type collection or from the same type plant, as the one on which the legitimate name was based. For the oldest name on which all new names and new combinations have been based I propose the term **BASINYM,** and for all the new names and new combinations based on the basinym the term **ISONYM.** Taxonomic groups published independently as new species, but based on the type specimen of a valid name, or on a duplicate of the type specimen, are called **TYPONYMS.** A legitimate name may itself be a basinym or an isonym : if the former, it will have at least one isonym as its absolute synonym; if the latter, it will have one basinym as a synonym, though it may also have in its synonymy one or more isonyms. In either case there may also be one or more typonyms, in relation to which the legitimate name itself might be regarded as a typonym.

The following two examples will show how these terms are applied :—

(*a*) Both *Unona cochinchinensis* DC and *Unona Desmos* Dunal were based on *Desmos cochinchinensis* Lour., the second as a new name and the first as a new combination for the third name. *D. cochinchinensis* is, therefore, the basinym of the first two, both of which are its isonyms. In this instance *Desmos cochinchinensis* Lour. is also the legitimate name under the genus *Desmos,* the genus *Unona* being reserved for American species. Had the generic name *Unona* been applicable legitimately, *Unona cochinchinensis* (Lour.) DC would have been the legitimate name, while the other two binomials (one an Isonym and the other a basinym) would have to be quoted in the synonymy.

(*b*) *Actinophloeus cuneatus* Burret (1931) was based on a specimen derived from a plant cultivated in the Botanic Gardens, Buitenzorg, Java, under the gardens' no. V–I–16. Quite independently of this name, *Ptychosperma tenue* Becc. (1934) was described as a new species having for its type another specimen derived from the above mentioned plant from the Buitenzorg Botanic Gardens. Later on, with the first species for its basis, the new combination, *Ptychosperma cuneatum* (Burr.) Burr. (1935) was made. Here *Actinophlœus cuneatus* Burr. is the basinym of *P. cuneatum* Burr. and conversely *P. cuneatum* Burr. is the isonym of the former. Both these are typonyms of *P. tenue* Becc., and vice-versa. (see also the example in 2).

2. EQUIVALENT SYNONYMS have more or less the same particular circumscription or concept as the legitimate name, but are not based on the same type specimen, or its duplicate. Some of these may have been published originally as distinct from those to which they are now united, and possibly may have been based on the paratypes or the lectoparatypes of the species to which they are now reduced. Though they may have been generally accepted as identical or equivalent synonyms, some authors, particularly "splitter" botanists, may recognize in them as many species in the Jordanian sense as there are names.

Such names, even when cited in the synonymy, have been called legitimate names in the example given under Art. 60 (1) of the Rules; but it is evident from the definitions given in this paper, it is a misnomer to class them as such. They may be legitimate if they are maintained as independent species; otherwise they must be considered as illegitimate names.

Examples :—

(*a*) If, in the case of *Cucubalus* treated in the example under Art. 60 (1) of the Rules, one follows Miller and considers *C. latifolius* Mill. (1768) and *C. angustifolius* Mill. (1768) as two separate species distinct from *C. Behen* L. (1753), then Miller's binomials are legitimate; but if one follows other authors and regards Miller's species as synonyms of *C. Behen* L., then both Miller's names become illegitimate for *C. Behen* L. and equivalent synonyms of it.

(*b*) Blume, working out the plants cultivated in the Botanic Gardens, Buitenzorg, published *Calla silvestris* Bl. (1823), which later became the basinym of *Raphidophora silvestris* Engl. (1879). Hooker, studying the flora of the Malay Peninsula, found a *Raphidophora* plant that was not credited for the region under his purview, and which he described as *R. Wrayi* Hook. f. (1893). Later Ridley, examining the species of *Raphidophora* from Borneo, detected one that was not recorded for the country, and proposed *R. nigrescens* Ridl. (1905) as a name for it. Now it has been found out that, though the types of each of these species were derived from three different collections made in three different countries, nevertheless all the three species represent one and the same species. As *Calla silvestris* Bl. is the oldest of the three binomials published as new species, its isonym, *R. silvestris* (Bl.) Engl., becomes the legitimate name for the group under *Raphidophora,* with *R. Wrayi* Hook. f. and *R. nigrescens* Ridl. as equivalent synonyms and with *C. silvestris* Bl. as the absolute synonym.

3. Besides the two classes enumerated above there are synonyms which consist of names based on monstrosities; and of nomina dubia, confusa vel ambigua. These together with such synonyms of the above three classes as have been rejected by the special decisions of the Congress (nomina rejicienda) may be termed NOMINA EXCLUDENDA.

6. Legitimate Names (Arts. 69 and 60)

To the followers of the modern, so-called binomial, system of plant nomenclature, there is no Article more important in the new Rules of Botanical Nomenclature than Art. 69. It forms the basis of all the other regulations framed with the view to laying down the correct procedure to be adopted in putting the principle of priority in force. Almost all the illegitimate names, that could have been avoided by authors at the time of publication, have been published because the questions dealt with in this Article have been much disputed even by the staunchest supporters of the priority principle. And it is no exaggeration to say that this Article, if it had been properly worded and quoted, would have saved several botanists from being confused by the Rules and would have perhaps rendered some other Articles like Arts. 53–55 unnecessary or made them mere

sub-divisions of Art. 69. Yet students of the Rules note with vexation that this Article is given a secondary importance and that it is even ignored in Articles where reference to it is absolutely due. The chief defects in Art. 69 may be summarized as follows:

In the first place this Article, which forms a part or the basis of Arts. 53–55, is misplaced so as to be easily overlooked by botanists consulting the Rules for definite instructions on the retention of names and epithets of groups below the rank of genus (Sect. 9–11, Arts. 53–58), or even on the RETENTION OF NAMES AND EPITHETS OF GROUPS BELOW THE RANK OF GENUS ON TRANSFERENCE TO ANOTHER GENUS OR SPECIES, which is the title of the Section 9, Arts. 53–55. In the second place, Art. 69 is not referred to in Art. 60 (1–5) where illegitimacy of names is defined; consequently it might easily lead one to the erroneous conclusion that, though the violation of Art. 54 renders a binomial illegimate [Art. 60 (2)], the violation of Art. 69 does not. In the third place the terms legitimate and illegitimate are used equivocally both in the text and the example. And in the fourth place, Art. 69 leaves the point ambiguous when, after discarding all names regarded as not available or illegitimate under Arts. 60–68, there are yet available for the taxonomic group more than one name that is considered "not illegitimate" under Art. 60 (1).

In order to be able to discuss Art. 69 fully, it may be useful to transcribe here the text and the examples in extenso:—

"In cases foreseen in Art. 60–68 the name or epithet to be rejected is replaced by *the oldest legitimate name*,* or (in a combination) by the oldest legitimate epithet which will be, in the new position, in accordance with the Rules. If none exists, a new name or epithet must be chosen. Where a new epithet is required, an author may, if he wishes, adopt an epithet previously given to the group in an illegitimate combination, if there is no obstacle to its employment in the new position or sense.

"Examples: *Linum Radiola* L. (1753), when transferred to the genus *Radiola*, must not be called *Radiola Radiola* (L) Karst., as that combination is contrary to Art. 68 (3): the next oldest specific epithet is *multiflorum*, but the name *Linum multiflorum* Lam. (1778) is illegitimate, since it was a superfluous name for *Linum Radiola* L: under *Radiola* the species must be called *R. linoides* Roth (1788), since *linoides* is the earliest legitimate epithet available. The combination *Talinum polyandrum* Hook. (in *Bot. Mag.* t. 4833: 1855) is illegitimate, being a later homonym of *T. polyandrum* Ruiz et Pav. (*Syst. Fl. Per.* I, 115: 1798): when Bentham transferred *T. polyandrum* Hook. to *Calandrinia*, he called it *Calandrinia polyandra* (Fl. *Austral.* I: 172: 1863). This is treated, not as a new combination, but as a new name, *C. polyandra* Benth. (1863)".

If the word legitimate in the text is taken in the sense defined in the footnote to Art. 45, and, therefore, in the sense given in this paper, then the Article ceases to be an instruction, for a taxonomic group can bear only one name that is "strictly in accordance with the Rules" (=legitimate). Should the Rules

* Italics are mine.

make it possible for a taxonomic group to bear more than one legitimate name, then the element of simplicity, uniformity, definiteness and stability will at once disappear from plant nomenclature. The Rules do not admit, therefore, an old or older, or the oldest, legitimate names.

If, as in Arts, 20, 56 and 60 (2), the word legitimate is taken to mean valid as defined here, the first sentence of the text of Art. 69 will have a meaning, but nevertheless the instructions will be far from clear. In the first place it will be seen that the word illegitimate in the text and in the examples cannot be taken to mean invalid. As it might mean illegitimate in the sense given to the term in Art. 60 it will be worth while, at this stage to analyse this Article also.

It is obvious that the word illegitimate, as interpreted in Art. 60 (2–3) means illegitimate; and as interpreted in Art. 60 (4–5) means invalid; both in the sense given here. But to give a precise interpretation to it as used in Art. 60 (1) is an impossibility, despite the definitions and examples given. I surmise that in the first (*Cainito*) and third (*Chrysophyllum sericeum*) examples, an illegitimate name means either an invalid (or illegitimate?) name published in contravention to Art. 59, or a later typonym, when the earlier name was legitimate; or perhaps a new name published illegitimately when a new combination was possible.

In the second example (*Unisemà*), illegitimate might be taken to mean illegitimate as defined in this paper; and in the fourth example (*Cucubalus*) the phrase " not illegitimate" might be taken to mean not "not invalid" but illegitimate under certain conditions and legitimate under others; for this is a case of a synonym belonging to the EQUIVALENT class (example *a*).

With such different and ambiguous meanings given to one word and in one Article, how can Art. 69 be clear and unequivocal? Is *Linum multiflorum* Lam. referred to in the first example under Art. 69 an invalid name (which it does not appear to be) or a later typonym or isonym? Why after the exclusion of *Radiola,* is the trivial name *linoides* " the earliest legitimate epithet available", and why should the binomial *R. linoides* Roth have priority over *L. multiflorum* Lam.? Is *R. linoides* Roth an equivalent synonym of *L. Radiola* L.? In a hypothetical case, if the species *L. Radiola* L. had to be transferred again to a new genus where the specific epithet *Radiola* could not be used, is the author effecting the transference obliged to adopt again the later specific epithet *linoides* and definitely reject *multiflorum?* Since from the text and the examples under Arts. 60 and 69, it is not possible to give definite answers to these questions, it is no wonder that botanists find the Rules as confusing as ever, and go on creating new binomials knowing fully well that many of them will have to be rejected later as illegitimate.

7. Three Customary Procedures Affecting Art. 69

I enumerate here three practices that are current among the supporters of the priority principle, one of which may be legitimized under the Rules. In this exposition I leave tautonyms and names of unequal rank out of consideration. The reasons for excluding these are:—(*a*) According to the definitions given above, tautonyms are invalid names, and therefore, must not enter into nomenclatorial considerations. (*b*) The practice of taking into account names of unequal rank for the purpose of priority is almost dead and is moreover, condemned by Art. 58 of the Rules. For the purpose of priority and legitimacy only valid names of the same rank as the corresponding taxonomic group under consideration are to be taken into account. The procedures may be enunciated thus:

When there are available for a taxonomic group several rival names of equal and corresponding rank, reject all Nomina Excludenda because their status is doubtful or ambiguous, or because they have been excluded once for all by special decisions of the legislative body. After having done this, then adopt any of the following procedures:

(1) Of the remaining rival names, *omit also the later homonyms;* then in the case of the names of a family or a genus, the oldest name becomes also the legitimate name. In the case of the subdivision of a genus, or of a species or a variety, the epithet of the oldest name of corresponding rank becomes the legitimate; but if this epithet cannot be used in the new, required position, because of the resulting tautonym or later homonym, then *the oldest name of equal rank already existing in the required position* becomes the legitimate name for the group. If none exists, the author is free to choose any epithet he likes, being allowed also to use the epithet from any of the several synonyms and homonyms, irrespective of their age, provided its use does not create a tautonym or a later homonym.

(2) For the first part follow the procedure as enunciated in (1); but in a new combination where the oldest epithet cannot be legitimized for the taxonomic group below the rank of genus because of the resulting tautonym or a later homonym, the author must adopt the epithet from *the next oldest name* that can be used, without producing a tautonym or a later homonym, *regardless of the required position.* If none exists, then the author is free as in (1) to apply any legitimable epithet he chooses.

(3) The third procedure is to *include all valid names* that are not nomina excludenda, so that in the case of a taxonomic group of the rank lower than a genus, *later homonyms are also taken into account.* In the case of the names of families and genera, the legitimate name is the oldest name of the corresponding rank that is not a later homonym. In the case of names of the sub-

divisions of a genus, or of the species, and the varieties, choose as the legitimate epithet for the group, the one from the oldest name of corresponding rank, unless the epithet thus chosen either is in the required position a later homonym, or when transferred to the required position, produces a tautonym or a later homonym. If either of these obstacles exists, then *the next oldest epithet* that can overcome both these obstacles must be used as the legitimate epithet for the group. If none exists, then the author is free to choose any legitimable expithet he likes.

Examples:—

(*a*) Assuming *Linum Radiola* L. (1753), *L. multiflorum* Lam. (1778) and *Radiola linoides* Roth (1788) given in the example under Art. 69 to be all valid names, *R. linoides* Roth is the legitimate name for the species according to the first procedure, because the oldest specific epithet cannot be used under the genus *Radiola,* and because *R. linoides* Roth is the oldest name under *Radiola.* In the next example Bentham was not obliged to adopt the specific epithet *polyandra* when he transferred *Talinum polyandrum* Hook. to the genus *Calandrinia* because *T. polyandrum* Hook. was a later homonym.

(*b*) According to the second procedure, one is bound to adopt the epithet *multiflorum* under *Radiola,* because *L. multiflorum* Lam. is the next oldest name; but one is not obliged to adopt the specific epithet *polyandrum* under *Calandrinia,* for *Talinum polyandrum* Hook., because this was a later homonym.

(*c*) According to the third procedure, the author is bound not only to adopt the specific epithet *multiflorum* under *Radiola,* but also to use the epithet *polyandra* under *Calandrinia,* because *Talinum polyandrum* Hook. is the oldest valid name for the species and the specific epithet can be legitimized under *Calandrinia.*

The first procedure is not followed generally by strict supporters of the principle of priority. It seems probable that, in drafting Art. 69 of the Rules, the legislators had this procedure in mind. The second may be considered a reasonable procedure, but it has never received any great support from the followers of the priority principle. The third procedure is the most favoured of all the three practices. And as it follows, from the provision made at the last Congress (1935) for validating and legitimizing alternative names (*see* below for the definition) even though the basinym is a later homonym, that the practice of basing a new combination on a later homonym cannot be entirely condemned, the third procedure appears to me the most natural outcome of putting the principle of priority in practice. Besides under the priority principle the epithet for the correct rank of a taxonomic group is of greater importance than its disposition in the correct genus or family.

One of the principal reasons why some botanists object to the second and the third procedures indicated above is that they think that it should never be possible to legitimize a name published in contravention of the Rules. But even if the first procedure was adopted as a rule, it would not be possible to

achieve this object in every case, as it will be seen from the following hypothetical case:

Supposing *Linum multiflorum* Lam. in the above example was a valid and legitimate species quite distinct from *Linum Radiola* L. and *Radiola Linoides* Roth, and Roth, in transferring that species to the genus *Radiola,* had used the epithet *pauciflorum,* rejecting *multiflorum* as unsuitable for the species, then Roth's *Radiola pauciflorum* nom. nov. would contravene Art. 59 of the Rules. Now if someone were to publish the name *Radiola multiflorum* for a new species, then *R. multiflorum* (Lam.) comb. nov. would not be legitimable, and, owing to the reservation of this binomial for the new species, *R. pauciflorum* nom. nov., although published in contravention of the Rules, would become automatically the legitimate name for *L. multiflorum* Lam. under the genus *Radiola,* unless legislation is passed invalidating all the names published in contravention to Art. 59.

8. What a New Combination or a New Name is

These terms are so familiar to any taxonomist that it might appear fatuous on my part to try to explain them here. But as they are not defined in the Rules and as in one instance at least, they seem to have been mis-stated, it appeared to me that a consideration on the matter would not be out of place.

Both a new combination and a new name are validated by citation so that both these terms imply the existence of a basinym on which each is based, though, as explained above, a basinym may have, for its isonyms, both a new name and a new combination at the same time. But all basinyms must be valid names; consequently a species, published by referring to an invalid, or pre-Linnean, name, figures and description cannot be called either a new combination or a new name, but must be called a new species. If the specific epithet in the basinym and in its isonym is the same, then the isonym is called a new combination; if the specific epithet in the basinym is different from that of its isonym, then the isonym is a new name. According to this definition, *Calandrinia polyandra* Benth. in the second example under Art. 69, must be called a new combination based on *Talinum polyandrum* Hook., and not a new name as stated in Art. 69.

9. Alternative Names

Now alternative names (nomina alternativa seu eventualia) are generally new combinations published simultaneously with the basinym, though there is nothing in the new provision passed at the last Congress, to deter one from making alternative names that are new names (*vide infra*). In the example of alternative names discussed at the last Congress, the alternative name *Andropogon Bequærtii* De Wild. was quoted as *nom. nov.* of *Cymbopogon Bequærtii* De Wild. *sp. nov.;* but the distinction between new names and new combinations was not considered.

The practice of publishing alternative names has had an origin which, though not made clear at the last Congress, appears

to me quite sound. There are genera like *Andropogon* and *Cymbopogon*, *Ptychosperma* and *Actinophlœus*, and *Pasania* and *Lithocarpus*, where it is not yet possible to decide definitely whether it is better to split a genus into two or more genera, or to keep it entire and divide it into so many sections or subgenera. Specialists find as many good reasons in favour of the first alternative as they do in favour of the second. Now if an author accepted such a genus sensu lato and published new species in a section of such disputable status, a botanist in search of easy honours might at once seize the opportunity, whether he had himself studied the group or not, to make new combinations under the alternative and disputed genus based on the binomials of the first botanist; or *vice-versa*, had the specialist published the new species under the latter genus, it would not have deterred the second botanist from making new combinations under the former. In such a case, though the second botanist might have no opinion of his own on the genera and might even be utterly unacquainted with them, the Rules would oblige one, as they do even now, to accept the new combinations made by him. It is to curtail such vexatious activity, and also to keep the honour where it is due, that the practice of publishing simultaneous isonyms or alternative names has arisen. Therefore it was but just that it was validated by the last Congress.

I think it is necessary to make additions to this amendment prohibiting alternative names that are not new combinations and also alternative names of a different rank from the basinym. According to these provisions *Conyphyton* or *Minima* could not be proposed as an alternative name to *Mesembryanthemum* sect. *Minima*, nor *Cymbopogon fluminense* var. *riparium* to *Cymbopogon riparium*, as these names belong to different ranks; neither *Cymbopogon riparium* or *Andropogon riparium* could be proposed as alternative to *Cymbopogon fluminense*, because the trivial epithets are different. Without such an amendment, new names or new combinations of equal and unequal rank could be proposed as alternative names.

10. Rival Names of Equal Age and Equal Rank (Arts. 56 and 61)

When for one species there are available two or more valid names of equal age, then Art. 56 instructs us to follow the botanist who first preferred one of them as the legitimate name for the species. It should have been added here that, if the name first chosen cannot be legitimized, then the author who is first to choose the next legitimable name must be followed.

When one and the same name is used simultaneously for more than one species, according to the new addition to Art. 61, "the first author who adopts one of them, or substitutes another name for one of them, must be followed".

In cases foreseen in Arts. 56 and 61 I think it is necessary to give new combinations a precedence over new names; and these over new species. Again when homonyms of equal age are isonyms of equal kind, those which have older basinyms should be preferred. The reason for this preference is that, though the age of a binary or ternary name is counted from the time it is published in its correct position and rank in a genus or a species, the age of the epithet itself is counted, according to the priority principle, from the date of its first publication in the same rank for the group but independently of the position regarding its family, genus or species, so that when a new species is older than a homonymous new combination, the former takes precedence; but when they are of equal age, the principle of priority should oblige one to give precedence to those isonyms which have the oldest basinyms.

Thus, whenever *Colocasia esculentum* (L. 1753) Schott (1832) and *C. antiquorum* Schott (1832) isonym of *Arum colocasia* L. (1753) are regarded as synonymous, the former should be chosen as the legitimate name for the taxonomic group thus constituted. So also whenever one of these is to be reduced as a variety of the group, it would be the new species, and not the new combination, that would have to be relegated to the varietal rank.

Further it is also necessary to add here that the choice made under Arts. 56 and 61 holds effective so long as the species or names remain in the same genus under which the choice was made; but on their transference to another genus, the author who first made the distinction in the new position must be followed, provided this distinction does not conflict with the rule of precedence.

Thus, even when someone had discovered that *Arum colocasia* L. (1753) and *A. esculentum* L (1753) were synonymous and reduced the latter to a synonym of the former, Schott (Syn., 1856, p. 41) would not have been justified in reducing *A. esculentum* L. (1753) to a synonym or variety of *Colocasia antiquorum* Schott (1832)=isonym of *A. colocasia* L. (1753); for such a reduction is inadmissible under the priority principle, as it would mean giving to a younger epithet precedence over an older one, when the latter is legitimable in the required position. Hence Hubbard and Rheder (Bot. Mus. Leafl. Harvard Univ. I, 1932, No. 1 p. 5) are justified in publishing the combination, *Colocasia esculenta* (L) Schott (1832) var. *antiquorum* (Schott) Hubb. et. Rhed. (=*Colocasia antiquorum* Schott) without first inquiring into the history of their respective basinyms, *Arum esculentum* L. and *A. colocasia* L., But it seems to me that the combination *Colocasia esculenta* (L) Schott. var. *colocasia* comb. nov. (=*A. colocasia* L.) would not have been contrary to the Rules as they stand. (see also the examples in the next section 11).

11. Isonyms of Unequal Age based on Basinyms of Equal Age

As proposed above, under equal circumstances isonyms that are new combinations should have precedence over new names. But the case where the basinyms are of equal age but their isonyms are of different ages, has so far remained untreated. From a study of the recent works of eminent taxonomists, it is evident that there is no fixed procedure for dealing with the

case; but, as a general rule, I think that the isonym which is the older or the oldest should take precedence. Thus, of names *Bruguiera gymnorrhiza* (L.) Lam. (1797) and *B. conjugata* (L.) Merrill (1914) which were based on basinyms of equal age, *Rhizophora gymnorrhiza* L. (1753) and *R. conjugata* L. (1753), botanists should, in my opinion, be obliged to adopt *B. gymnorrhiza* (L.) Lam. as the legitimate name whenever the two species are regarded as conspecific. At least that has been the procedure long current among the strict supporters of the priority principle, though some botanists of high reputation have now begun to use the younger of the isonyms as the legitimate.

However this rule of procedence, if followed in every case, might seem to give rise to difficulties. Suppose, before Lamarck made his combination, *B. gymnorrhiza,* a botanist had detected the identity of the two species and reduced *R. gymnorrhiza* L. as a synonym of *R. conjugata* L., then under Art. 56, *R. conjugata* L. has to be retained as the legitimate name whenever the two are retained under the genus *Rhizophora* and are considered as conspecific; but it does not say anything if Lamarck, in transferring the species to *Bruguiera,* had inadvertently or deliberately, made the new combination with *R. gymorrhiza* L. as the basinym and with or without *R. conjugata* L. as a synonym. To some this combination might seem illegitimate and they might be tempted to consider, under such circumstances, *B. conjugata* (L) Merr. (1914) as the legitimate name. But not only under the rules of precedence but also under the most common procedure affecting the priority principle, *Bruguiera gymnorrhiza* (Linn.) Lam. (1797), being the older of the two isonyms of the basinyms of equal ages, is the legitimate name under *Bruguiera.*

Such cases mentioned here and in section 10 are extremely rare; but they show the effectiveness of the strict application of the rule of precedence in preventing usages that are contrary to the accepted principles of nomenclature and in ensuring simplicity and uniformity in the solution of such complicated problems.

12. Varietal Names

Of late there has been a tendency to regard a specific name (even when the species itself was originally described from a single type specimen) as a conglomeration of varieties and then to give each variety a separate name. In naming the varieties two common procedures exist: the first is to call *var. genuina, typica, primitiva, communis,* etc. the form that the author, who makes the separation into varieties, considers as the most primitive or the most common of the varieties, it being immaterial whether this form agrees with the type of the species or not. If the type form does not agree with the so-called primitive or common form, then the type form receives another varietal name. The second procedure is to call *var. typica, genuina* or *originaria* the type form (*i.e.* the form that agrees with the type specimen) and to give new names to other forms. The latter procedure is approved in the Recommendation XVIII of the Rules, while the first, though not expressly condemned, is being abandoned by botanists. But I consider that even the

second procedure is wrong and, if admitted as valid, gives rise to combinations that are contrary to the spirit of the Rules themselves and that might not be in accordance with either of the procedures mentioned above.

Thus *Colocasia esculenta* (L) Schott var. *antiquorum* (Schott) Hubbard et Rheder (1932), being a later isonym of equal rank for *C. antiquorum* Schott var. *typica* Engl. (1879), would have to be called *C. esculenta* (L) Schott var. *typica* (Engl.) com. nov., a combination that might not be applicable either to the type of the species or to the most primitive or the most common form. Further since the Rules themselves do not condemn the procedure which admits giving a new varietal epithet to the type specimen of a species, while using such terms as *typicus, primitivus,* or *communis* for the form which is either the commonest in the wild state or the most primitive, it appears that one cannot consider invalid the trinomial *Aglaonema angustifolium* N. E. Brown var. *undulatum* Ridley (Mat. Fl. Malay. Pen., Monocot., III, 1907, p. 21), although the varietal name is given exactly to the same form as represented by the type of *A. angustifolium* N. E. Br. (1895).

Engler reduced *Aglaonema angustifolium* N. E. Br. (1895) to a synonym of *A. Schottianum* Miq. (1856) and named the form represented by Brown's type (*A. angustifolium* var. *undulatum* Ridl.) as *A. Schottianum* Miq. var. *Brownii* Engl. (Pflanzenreich, hft. 64, 1915 p. 21). But under the priority principle this varietal name of Engler's cannot be the legitimate one, since of the two varietal names, *undulatum* (1907) and *Brownii* (1915), the former is both legitimable under *A. Schottianum* Miq. and earlier.

Further Ridley mentions the "typical form" (*i.e.* the common form) of the species, *A. angustifolium* N. E. Br., but does not give it a name. Had he called it var. *typicum,* then on its transference to *A. Schottianum* Miq., we should have, side by side with *A. Schottianum* Miq. var *genuinum* Engl. (1915) containing the type of the species, *A. Schottianum* Miq. var. *typicum* comb. nov., not containing the type, and with the possibility that neither of the varieties represented the commonest form of the species when viewed in the broad sense.

The other alternatives are either to repeat the specific epithet (recommended under the Rules, Rec. XVIII), or to regard *C. antiquorum* Schott as equivalent to *C. antiquorum* Schott, subsp. *antiquorum* Schott, var *antiquorum* Schott, forma *antiquorum* Schott. In the last case the Recommendation XXXVI (2) will automatically become a rule and oblige botanists to choose *antiquorum* as the legitimate epithet whenever *C. antiquorum* is reduced to a variety or a subdivision of another species. This would necessitate an alteration in the text of Art. 58.

But to admit such names as *Colocasia antiquorum* var. *antiquorum* or *C. antiquorum* var. *genuinum,* and *Aglaonema angustifolium* var. *augustifolium, A. angustifolium* var. *undulatum,* or *A. angustifolium* var. *typicum* (or genuinum etc.) all referring respectively to the type of *Colocasia antiquorum* Schott and *Aglaonema angustifolium* N. E. Br. would be tantamount to adopting ternary specific names in modern botanical nomenclature and to making the present obligation to use the binary names for species a farce or non-obligatory. Further, an

acceptance of such ternary names will, in turn, have to be followed by the removal of the ban on all those books that are now condemned for not using the binary specific names in their nomenclature.

In my opinion, therefore, all such ternary names, when applied to the type of the species and retained under it, should be condemned as being contrary to the binomial system of nomenclature. Though *Aglaonema angustifolium* N. E. Br., could *in sensu lato* be used to include all the subspecies and varieties described under it, *in sensu stricto* it must be applicable the Holotype and the plants represented by it: all trinomials with *A. angustifolium* as the first part being invalid for this form.

13. Nomen Dubium or Mixtum Compositum* (Arts. 52, 62–65)

When a species is to be divided into two or more species, Art. 52 of the Rules provides for the retention of the specific epithet to the type designated by the author. But in the case

* A *Taxonomic Name* must indicate only one element of its rank. A *Mixtum Compositum* is a taxonomic name which by definition covers more than one element of the same rank, or to which more than one element of the same rank has been assigned in the original description. All plants belonging to one form, or variety, or species, or genus (etc.) make, in the opinion of a botanist, one *ELEMENT* of the same rank. There are two kinds of *Mixta Composita:*

(1) NEGATIVE MIXTUM COMPOSITUM: a name whose description is so vague as to be applicable to more than one element. These may be subdivided according to their types as follows:

(*a*) types represent more than one element, but the holotype is indicated;
(*b*) types represent more than one element, but the holotype is not indicated (=*nomen dubium*);
(*c*) types are not extant (=*nomen dubium*).

(2) POSITIVE MIXTUM COMPOSITUM: either **(A)** a taxonomic name whose description includes discordant characters, each set being applicable to one element, and whose types are either

(*a*) not extant (=nomen confusum);
(*b*) or if extant, then either a holotype is not indicated (=nomen confusum); or
(*c*) a holotype is indicated.

or **(B)** a name whose description, though not containing discordant characters, agrees only partly with the indicated holotype.

If in **(1)** all syntypes represent one element, then such a taxonomic group is excluded from the category of a mixtum compositum; if in **(1)** and **(2)** the types are extant and a holotype is indicated, the Rules oblige us to interpret the name with reference to the indicated holotype, even when this type is not the one that agrees best with the description. If types are extant and do not agree with the description at all, then the probability is that some types are lost, or that the author has used a wrong terminology to describe the characters of the type specimens. It is only when the primary types are not extant, or when extant one of them is not indicated as a holotype, that the difficulties arise in interpreting satisfactorily a *mixtum compositum*. In common parlance a *mixtum compositum* means a name of any of the two classes: (2–A–*a*) and (2–A–*b*).

where the type has not been designated, regulations for choosing the lectotype have not yet been made; so that it is quite easy at present to reject a species whose syntypes represent more than one species, as a nomen confusum, dubium vel ambiguum (Arts. 62–64).

Yet if one were to apply these provision (Arts. 62–64) in every case, where a specific description was drawn from syntypes representing more than one species, I think the majority of the specific names from the time of Linnæus down to the end of the last century will have to be discarded, and a similar fate might also await several names published during the last thirty or forty years.

The usual procedure in such cases has been to retain the name for that one of the syntypes that agrees best with the description, and to exclude from the species all other specimens that do not correspond with the selected syntype (=lectotype). Should there be more than one such specimen having equal claims to be selected as the type and should they represent more than one species, the first author to choose one of them as the type must, in my opinion, be followed. This principle is also in accordance with the provisions made in Arts. 56 and 61 for selecting one name as the legitimate from a number of rival names of equal age.

If this procedure be legitimized, a large number of species having now a disputable status will become clear and stable, thereby diminishing the number of the nomina ambigua, dubia vel confusa. In fact I think that the Appendices for Nomina Ambigua and Nomina Confusa should not be prepared unless this procedure, and the one recommended for interpreting the species validated by references to invalid but effective literature (Class II), are found unworkable (which might be only in a very limited number of cases). The principle if adopted will induce also a better research into the status of old species and it will avoid a haphazard rejection of species on the basis of our ignorance.

Examples:—

(*1*) Under *Cerbera Manghas* L. (1753) Linnæus cites several entirely discordant elements which have made some botanists either reject the species as mixtum compositum, or interpret it with reference to one or other of the discordant elements that do not agree with the description. It is true that Linnæus cited several references that are not identical with the type on which the description was based; but in doing this Linnæus was keeping up the procedure of the times which, perhaps with the intention of helping the students of the local floras, made botanists include in the synonymy all the references that they not only considered as equivalent, but even suspected as approximate, synonyms. In my opinion the ambiguity or confusion has arisen on this Linnean species owing either to the failure to notice that the lengthy specific description of Linnæus was derived from Osbeck's specimen from Java, or to the imperfect acquaintance of some botanists with the genus; for it is obvious that the Linnean description is not applicable to *C. odollam* Gærtn. at all but is

exactly *C. lactaria* Ham. *ex* DC. Much harm would result if, owing to imperfect acquaintance with genera or species concerned, or owing to failure to account correctly for the type specimen, one were to reject a good species like *C. Manghas* L. as a nomen ambiguum, confusum, vel, dubium, or to conserve another name against it.

(*z*) Under *Poa amboinica* L., *Mantissa* II, 1771, p. 557, Linnæus gave a specific description which does not agree either with the plate or with the description of *Phœnix amboinica montana* Rumph. (Herb. Amboin. VI p. 19 t. 7 fig. 3), a reference given by Linnæus in the synonymy of the species. In 1786 Retzius pointed out these discrepancies and excluded the Rumphian species from *P. amboinica* L., retaining this name for a South Indian plant which was distributed under the name by Kœnig, and with which the Linnean description agreed. It is not known whether Retzius had seen the actual type specimen, or its duplicate, on which Linnæus based his description, nor does he give any reasons why he interpreted the species by reference to Kœnig's specimen. There is also no specimen in the Linnæan herbarium to decide this matter. But seeing that Retzius was a contemporary of Linnæus and Kœnig, and that Kœnig corresponded with several botanists in Europe including Linnæus and Retzius, it is not unreasonable to suppose that Retzius had clues, now lost to us, that warranted his interpretation by reference to Kœnig's specimen. Mr. C. E. C. Fischer, who inquired into this subject, also supports this conclusion. (Kew Bull. 1934 p. 398). But the absence of any obligation for botanists to follow the first botanist (in this case Retzius) who selected the lectotype or neotype of *Poa amboinica* L., has made some take the Rumphian figure as the type of the Linnean species, causing thereby instability and lack of uniformity in the nomenclature of the two species, and has made others favour the rejection of *P. amboinica* L. either as *nomen ambiguum* or *nomen confusum*.

The most difficult problem that arises in stabilizing plant nomenclature is in regard to species, the types of which are not extant and the original description of which seems to be inadequate for the correct specific identification. In such cases it is customary to identify the species by interpreting their botanical descriptions on plant-geographical considerations. But if, by such a procedure, one cannot definitely accept or reject a given interpretation of such a species, then one should be obliged to follow the earliest interpretation that is not obviously discordant with the original description. It should be prohibited to interpret the species merely on the vernacular names, and the economic uses, enumerated in the original descriptions, and to make changes accordingly in the specific nomenclature. The particulars about the vernacular names and the economic uses of a species may supply a clue to its ultimate identification on a scientific basis, but they cannot be accepted as decisive, or even as a part of the botanical description. In this field it is desirable to restrict the activities of those who rely on such means because their activities are often a source of great confusion in plant nomenclature and lead to instability in the nomenclature of the species that had otherwise definite and stable botanical names.

I enumerate here a list of principles which have proved useful to me in the interpretation of a mixtum compositum, or

a doubtful species whose types are not extant. It might be worth while to give these a trial in order to test their universal utility :

A. When a description covers more than one species or varieties (or element), *then give more importance to:*

1. the characters mentioned both in the body of the description and in the remarks than to those mentioned under the remarks only and not in the description, when under the remarks the author recognized more than one form of the species sensu lato. The probability is that the characters mentioned only in the remarks have been deliberately excluded from the body of the description because they belong to one of the subordinate groups, not to the typical form;
2. the characters mentioned in the body of the description than to those mentioned in the remarks, if the remarks refer to a form or variety different from the one described in the body (*e.g. Croton polot* Burm.f.);
3. the characters mentioned in the description than to those not mentioned in it but figured in the plate published simultaneously with the description, even though these characters have been cited in the remarks as belonging to one of the subordinate groups constituting the main group;
4. the characters recognizable by the senses of touch and vision than to those recognizable by the sense of taste and smell;
5. the characters referring to twigs, leaves, flowers and fruits than to those referring to the entire plant, and observable only in the field;
6. the characters visible in the dry state (and referring to twigs, leaves, flowers and fruits) than to those observable in the field or in the living state, except when there is a clear evidence to show that the author studied the plants in the field and not in the herbarium, in which case both sets of characters could be given an equal value (as in Blanco's *Flora de Filipinas,* Loureiro's *Flora Cochinchinensis*);

and 7. characters observable on the plant itself than those referring to its economic uses (cf. also C. 2).

B. Attach *equal importance to:*

1. the specimens cited but not figured and to those that are both cited and figured. Very often the specimens studied are not the ones that are figured; and very often, too, figures are not drawn by the

authors themselves, but by their draughtsmen. Out of these specimens choose as the lectotype the specimen that agrees best with the description;

2. the specimens cited but not figured and the specimens not cited but figured, provided there is clear evidence to show that the description covers both. (*e.g. Polypodium sessilifolium* Hk., the type of which is taken to be the specimen figured, although it was not cited; *see* Gard. Bull. S.S. IX p. 134.)

and 3. the characters observable in the field like the colour, height of the plants and the thickness of the main trunk and those observable in small specimens consisting of twigs, leaves, flowers, and fruits, provided there is a clear evidence to show that the author drew his specific description in the field and not in the herbarium.

C. *Disregard altogether* any information or particulars regarding :

1. vernacular names;

2. such economic uses as do not give any clue as to the nature, size, and colour of the plants;

and 3. any part of the plant if there is a definite evidence to show that the author derived that bit of information from others or from books and herbarium labels;

but these actions are to be taken only when the particulars on any of these points introduce the discordant element in the description, or render a decisive interpretation impossible. These particulars, if taken into account, must not be made the principal basis for rejecting an accepted interpretation of a species.

D.—(1) If a mixtum compositum (positive) covers two or more species or elements of a rank higher than that of species, then follow the earliest interpretation that takes into account all the *characters of greater importance,* even if this interpretation does not agree with the characters of lesser importance. In the interest of stability in the names of families, genera, and species, a consideration of characters of lesser importance (such as those observable in the living state only and as undergo change during drying) must not be admitted as a plea of sufficient importance for rejecting an earlier interpretation because such a rejection might affect profoundly the long accepted nomenclature of several species, genera, etc.

(2) If a mixtum compositum (positive) consists only of different varieties or of forms of lower rank than species, then accept the earliest interpretation that takes into account *both the important and the less important* botanical characters.

(3) If it is a question not of a (positive) mixtum compositum, but of an apparently indifferent description that seems applicable to more than one element, and whose types are not extant, or if extant represent more than one element, then the botanical *characters of lesser importance must also be considered,* and the earliest interpretation that fits in with all the botanical characters given in the original description and with plant geographical considerations must be accepted. A ruling to this effect might discourage interpretations of old, doubtful species without an adequate study and reason.

E. If the name of a mixtum compositum, positive or negative, has been long overlooked by botanists, or if it has been excluded as a species of doubtful affinity or as a nomen dubium, or confusum, it should not be used for any taxonomic group without adequate botanical reasons, or proofs (*vide infra*), when the adoption of such a name leads to changes in the accepted nomenclature of species and genera. The very fact that the name of a doubtful species has long been cited in the synonymy must not be taken as a reason of sufficient importance to adopt the name under the principle of priority. Such names have been frequently cited in the synonymy of a species, not because the names are identifiable, but because the authors citing them suspect them to be identical and hope the citation may form a clue to the ultimate identification of the mixta composita on botanical grounds.

NOTA: By PROOFS or ADEQUATE BOTANICAL REASONS are meant the reasons why the name must be clinched to a particular taxonomic group and not to any others, or how the description published under the name agrees with that of the taxonomic group identified with it. Thus I would consider *Mischophlœus vestiaria* (Giseke) Merrill, Interpr. Rumph. Herb. Amb. (1917) 121 and *Ormosia pinnata* (Lour.) Merr. in Lingnan Sci. Journ. XIV (1935) 12 as examples of interpretations unaccompanied by any reasons except by the writer's statement of his convictions, while that of *Cerium spicatum* Lour. and *Aidia cochinchinensis* Lour. by Moore in Journ. Bot. LXIII (1925) 250 as examples of interpretations accompanied by proofs or adequate botanical reasons.

14. Tautonyms and Homonyms

The regulations concerning tautonyms are embodied in the following extract of Art. 68 (3):

"Specific epithets are illegitimate in the following special cases and must be rejected.————(3) When they exactly repeat the generic name with or without the addition of a transcribed symbol (tautonym)————Examples————(3) *Linaria Linaria, Nasturtium Nasturtium-aquaticum.*"

From this it is evident that tautonyms come under the regulations enacted as essential for the words constituting a

specific name, and, therefore, are to be regarded as invalid names. And so far as the wording goes, this rule appears to be complete in itself, though it is not clear under what provision the binomial *Nasturtium Nasturtium-aquaticum* is to be regarded as a tautonym, unless of course *aquaticum* is considered as a symbol. But if one considers this Article in conjunction with the regulations on the orthography of names (Art. 70), there appears to be much room for equivocal interpretations.

That the reasons for asserting this may be better followed I transcribe here some parts of Art. 70 that are to the point:

"When the difference between two generic names lies in the termination, these names must be regarded as distinct, even though differing by one letter only. This does not apply to mere orthographic variants of the same name."

"Note 3: In deciding whether two or more slightly different names should be treated as distinct or as orthographic variants, the essential consideration is whether they may be confused with one another or not: if there is serious risk of confusion, they should be treated as orthographic variants. Doubtful cases should be referred to the Executive Committee."

"Note 4:————Epithets bearing the same meaning and differing only slightly in form are considered as orthographic variants. The genitive and adjectival forms of a personal name are, however, treated as different epithets (*e.g. Lysimachia Hemsleyana* and *L. Hemsleyi*)".

Further we are told that generic names like *Rubus* and *Rubia Peponium* and *Peponia, Iris* and *Iria, Gerrardina* and *Gerardiina Desmostachys* and *Desmostachya,* or *Peltophorus* and *Peltophorum* are not pairs of homonymous names. This appears surprising, because one would think that they should come under the provision made in Art. 70, Note 3, which permits one to treat a name as an orthographic variant even when a name or epithet, owing to its close similarity with another of the same rank but of different origin, is liable to be confused with the latter. Yet we are told that such words as *napaulensis, nepalensis* and *nipalensis; heteropus* and *heteropodus; Bradlea, Bradlœia, Bradleja* and *Braddleya; trinervis*(*-e*) and *trinervius*(*-a, -um*); are groups of orthographic variants. The first two groups of epithets are regarded as orthographic variants, apparently because they mean the same thing, and because they are derived from the same word, or because they refer to the same place; the third group of words because they all refer to the same person and because each of them has been spelt by subsequent authors both as *Bradleia* and *Bradleya,* and this in spite of a ruling that changes in the original spelling are not to be recognized under Art. 70; but the last one, though it has the same meaning, has two different roots and belongs to two different declensions in Latin.

If *Bradlea Braddleya* is a tautonym because the second epithet is an orthographic variant of the first, the question arises whether such combinations as *Desmostachys Desmostachya, Gerrardina Gerardiina, Chœrefolium cerefolium* L., and *Kandelia*

Candel (L.) Druce are tautonyms? The principles regulating the homonymous generic names, if applied to these cases, would admit these as valid names and not reject them as tautonyms, though under usage, and perhaps under the provision in the Note 3 of Art. 70, one would be able to reject many such names as tautonyms. Further if *Nasturtium Nasturtium-aquaticum* is a tautonym, are *Radiola Radiolaris, Leontice Leontopetaloides, Ficus syco-morus* and *Pinanga Pinangifolia* also tautonyms? If such names as *Desmostachys Desmostachya* or *Gerrardina Gerardiina* are not regarded as tautonyms, despite the provision in Art. 70, Note 3, I see no reason for outlawing such binomials as *Bradlea Braddleya,* and *Radiola Radiolaris,* or even *Radiola Radiola.*

In this matter usage, too, has been very erratic, even amongst botanists who have shown manifest adhorrence for tautonyms; for, while they readily discard as tautonyms such binomials as *Normanbya Normanbyi* (F. Muell.) L. H. Bailey (1935) and *Sullivantea Sullivantii* Britton (1894), they admit without any protests binomials like *Cuminum Cyminum* L., *Kandelia Candel* (L.) Druce (1914) and *Carum Carvi* L. (the last being also spelt as *Carum Carui.*).

Similarly the regulation pertaining to homonyms is also unsatisafctory. Article 61 defines a later homonym as a name which "duplicates a name previously and validly published for a group of the same rank based on a different type.———Note : Mere orthographic variants of the same name are treated as homonyms, when they are based on different types.—*See* Art 70."

Does this means that binomials like *Baccaurea malayana* and *B. malayensis,* or *Rhizophora Candel* L. and *R. Candellaria* DC are to be treated as two pairs of homonymous names, on the ground that they bear the same meaning and differ but very slightly in form (Art. 70, Note 4)? If trivials epithets like *Ceylanica* (from Portuguese Ceylao), *Zeylanica* (from Dutch Zeylan) and *Ceylonica* (from the English Ceylon), or like *trinervis* (third declension in Latin) and *trinervius* (second declension in Latin) are to be taken as homonymous, because they mean the same thing, are epithets like *Ceylonica, Singalensis, Singalana, Sinhalensis, Singalica, Cingalensis* and *Ceylonensis; Brownei, Brownii, Morenii* and *Brunonis; Sinica* and *Sinensis; Hispaniensis, Hispanus* and *Hispanicus; Javana, Javensis, Javanensis* and *Javanica; Aquillaria* and *Agalocha; van-der-Brœcke* and *Paludanus; Saharæ* and *Saharana* (both referring to the country Sahara); *Anamitica* and *Annamensis; Celebica, Selebica* and *Celebesiana;* to be taken as homonymous groups? These questions do not appear to have been settled by the Rules, and the examples given in the Rules do not apply to such cases. The recent usage on this point is also very contradictory.

The treatment of homonymous generic names in *Kew Bulletin* (1935) 341–544 also shows a complete absence of uniformity in the principles adopted by different contributors to the *Bulletin*, thus confirming my contention that the Rules are equivocal on the subject of homonyms and tautonyms.

Thus Prof. Alfred Rheder (Arnold Arboretum) regards *Andrzeiowskia* Reichb. (1823) and *Andreoskia* DC. (1824) as orthographic variants, because both genera were named in honour of A. Andrzeiowski. If this principle is adopted as a general rule, it would appear that the Rules do not permit naming more than one genus after the same person.

But Miss M. L. Green (Kew) considers *Wendtia* Meyen (1834) not homonymous with *Wendia* Hoffm. (1814), though the latter name was "corrected" by De Candolle to *Wendtia* in 1830, that is, four years before *Wendtia* Meyen was published, and though both *Wendtia* (1834) and *Wendia* (1814) appear to have been published in honour of the same person. Apparently Miss Green has overlooked the case of *Bradlea, Bradlœia, Bradleja* and *Braddleya* discussed in the Rules, where we are told to consider these four generic names as mere orthographic variants, not only because they commemorate the same person, but also because each of them has been spelt by subsequent authors indifferently both as *Bradleia* and as *Bradleya,* and "only one can be used without serious risk of confusion."

Further Dr. R. Mansfeld (Berlin) treats *Pentaceros* Mey (1818), spelt later as *Pentaceras* by Roem. et Schult. (1819), as if it is homonymous with *Pentaceras* Hook. f. (1862); *Pentagonia* Benth. (1844) with *Pentagonium* Schau. (1843); and *Psilanthus* Hook f. (1873) with *Psilosanthus* Neck. (1790). And yet, in the Rules, *Peponium* and *Peponia, Symphostemon* and *Symphyostemon, Elodes* and *Elodea,* are cited as examples of distinct, non-homonymous names.

Then Prof. A. Rheder is not sure whether *Augusta* Leandro (1819) and *Augustia* Klotzsch. (1854) are homonymous names, despite their different derivation, but proposes the conservation of *Augusta* Pohl (1829), also spelt later as *Augustea,* though it is a monotypic genus having a legitimable valid synonym; and without waiting for the decision of the Congress, he makes the new combination *A. longifolia* (Spreng.) Rheder, apparently in the sure belief that this proposal will be accepted by the Congress.

In contrast, Mr. C. A. Wheatherby (Gray Herbarium) considers *Conocephalus* Bl. (1825) and *Conocephalum* Wiggers (1780) as homoymous names. He strikes *Conocephalus* Necker (1790)* out of consideration, because Necker did not publish a new genus of that name, but merely changed the spelling of *Conocephalum* Wigg., which change, he maintains, is inadmissible in the Rules. (That such changes are some times admissible for the purpose of homonyms may be seen in the example of *Bradlea* and *Braddleya* discussed under the Rules). Further he says that "*Conocephalus* Bl. was unanimously employed up to 1934", when Merrill abandoned it to take up *Poikilospermum* Zippel *apud* Miq (1864). He admits that even Merrill has not examined the type of the genus *Poikilospermum,* the botanical affinity of which is yet uncertain, and that further changes will be necessary if *Poikilospermum* is segregated generically from *Conocephalus* Bl. proper. He acknowledges that "the least disturbance in nomenclature would have resulted from conserving *Conocephalus* Bl. against its earlier homonym [*Conocephalum*

* According to the view of Dr. A. J. Wilmott (Kew Bull. 1935 p. 92) *Conocephalus* NECK., being a name of NECKER's "Species Naturalis", would be an invalid name, though all NECKER's "Species Naturales" correspond to LINNEAN Genera.

Wigg]———. Since, however, the number of species concerned is not very large (about 35), it is probably better to accept Merrill's treatment of the matter." This might be paying respect to the person of Merrill, but not to any principles given in the Rules, for the Rules have expressly instructed us to take the generic names like *Peltophorus* and *Peltophorum* as different, and not homonymous, names. Besides changes in the nomenclature of thirty-five species may seem insignificant to a non-Malayn botanist, but to Malayan botanists who have been accustomed to see *Conocephalus* Bl. used in the literature of a hundred years for a group of common forest plants, changes in the names of thirty-five species are rather a big and vexatious alteration, even more than to American botanists is the rejection of the name of the monotypic genus *Augusta* Pohl (1829), the conservation of which requires a new combination (now made by Prof. Rheder), because an earlier specific epithet is available for the species than the one hitherto used under the genus.

These cases also show how arbitrary is the present procedure of conserving or rejecting the so called homonymous generic names, without having first defined precisely what a homonym is.

In view of this it is highly desirable that the regulations on this point should be clarified so as to define, if possible, both the tautonym and homonym in the same set of general rules; for, strictly speaking, a tautonym ought to be defined as a specific name in which the trivial epithet is a homonym of the generic name. If it is impossible to frame general laws which shall be applicable equally to tautonyms and to homonyms, because of some difference in the principles appertaining to them, or because of the mighty nomenclatorial changes that may result from the application of any such uniform rules to all homonyms, then it is necessary to show in the Rules how and why these principles differ, so that the student of the Rules will be able fully to appreciate the regulations and, when occasion arises, to decide for himself whether or not a certain name is a homonym or a tautonym. If any extensive changes may result from the adoption of such principles in the generic nomenclature, then it will be advisable to conserve such generic names as exceptions to be mentioned in the Rules, where they will be handy. General laws are much better for the guidance of botanists than obligations to call now and then upon the Executive Committee to give its arbitrary decisions on the matter.

If attempts are not made to clarify this situation as soon as possible, then it is to be feared that the opinion, favouring tautonyms as legitimable valid names, will soon gain ground, and we may have to witness the present regulations against tautonyms and homonyms vetoed, or at least considerably modified, by future congresses.

If general laws, that give due regard to the derivation of the words, are not possible, then artificial rules such as the zoologists have, will be better adapted to the needs of systematists so that, apart from the generic names which, to prevent extensive changes, may require different rules, specific epithets, even of

different origin, may be considered as homonymous if they resemble each other very much, at least in the main part of the word. Besides now that the Rules do not acknowledge misapplications and miscitations as validly-published new binomials as was done formerly, there is no need to attach any great importance to the derivation and meaning of the words, provided serious risks of confusing one name with another are avoided and a uniformity in the rules is secured. Thus if *Gerardiina* and *Gerrardina* are not homonymous, there is no reason why *Bradlea* and *Braddleya* should be.

For this purpose the following groups of letters might be considered as equivalent:

(*A*) Terminations of generic, tribal, or sectional names: *a* = *ie* = *ea* = *eya*; *us* = *yus* = *ys* = *is* = *es* = *os*; *um* = *on* = *oon*.

(*B*) Terminations of epithets of species and of groups below the rank of species: *os* = *us* (*-a, -um*) = *ius* (*-ia, -ium*) = *is* (*-e*) = *yus* (*-ya, -yum*) = *ys* = *es* = *on* = *eia* = *eya* = *ea* = *aea*; *i* = *ii* = *yi* = *ei*;

(*C*) Letters standing in the middle of the epithets denoting genera, sections, tribes, species, varieties, etc.: *o* = *a*; *es* = *us*; *v* or *w* (as vowels) = *u*; *g* = *gh* = *gu*; *c* = *cc* = *ck* = *k* = *kk* = *ch* (hard); *c* (followed by *i, e, y, ae, oe*, except when *ae* is the genitive of the words ending in *a*, in which case *c* is hard) = *z* = *s* = *ch* (soft) = *ss*; *d* = *dd* = *dh*; *p* = *pp*; *t* = *tt* = *th* = *ct*; *ph* = *pf* = *f* = *ff* = *v* = *w* (when *v* and *w* as consonants); *m* = *mm*; *n* = *nn* = *nh* = *m* (before *b, p, m*, or *n*); *r* = *rr* = *rh*; *l* = *ll* = *lh*; *wski* (Polish) = *wiski*; *drze* = *dreze*; *ae* = *oe* = *ue* = *oy* = *ey* = *e* = *ii* = *i* = *j* = *y* = *yi* = *ei* = *iae* = *eae* (except when *ae* is the genetive of words ending in *ca, ga*, and *ka*, or is followed by *i*).

(*D*) Letters standing at the beginning or in the first syllable of the epithets or names of genera, sections, tribes, species, varieties, etc.:

(1) value of the consonants given in (*C*);

(2) *e* = *ae* = *oe*; *i* = *y*;

(3) a vowel preceded by *h* is equivalent to the vowel without the preceding *h*.

For the purposes of generic homonyms, the rules of terminations of the generic names and those for the middle and the beginning of the words (*i.e. A, C* and *D*) should be taken into account: while for the purpose of tautonyms, and homonyms of specific names and of names below the rank of species the regulation for the terminations of the specific epithets and for

the valency of letters occurring in the middle and at the beginning of the words should be taken into account. If it is desirable to regard such epithets as *malayana* and *malayensis; javana, javensis, javanensis* and *javanica; philippensis, philippinensis* and *philippina; timoriensis* and *timorensis;* or *anamiticum* and *annamense,* as homonymous, a paragraph could be added making adjectives ending in (*a*) *nus* (*-a, -um*) = *ianus* (*-a, -um*) = i (*n*) *ensis* (*-e*) = *ensis* (*-e*) = (*it*) *icus* (*-a, -um*) as homonymous.

This rule would make *Gerrardina* and *Gerardiina,* or *Anadendron* and *Anodendrum,* as pairs of homonyms; but not *Chonemorpha* and *Conomorpha;* but if it is desirable to keep the first two pairs as distinct, then they could be included as nomina generica conservanda, or as exceptions to the general rules.

As an extreme case, tautonyms might be defined as a specific name in which the specific epithet either is homonymous with the generic name (*Radiola Radiola*), or is an adjective or genitive (masculine or feminine) derived from it or its root (*Normanbya Normanbyi, Radiola Radiolaris*), or is itself the root of the generic name (*Kandelia Candel*), or still is the generic name with another word or particle added, with or without the change of the terminal ending of the generic name (*Nasturtium Nasturtium-aquaticum; Pinanga Pinangifolia; Pinanga pinangioides. Araucaria araucana*).

However it would be undesirable to put a ban on all such names. I think tautonym-phobes would be satisfied if only absolute tautonyms were invalidated, by defining absolute tautonyms as specific names where the trivial epithet, or its root, is homonymous with the generic name, or its root. This would outlaw all such names as *Normanbya Normanbyi, Carum Carui* L., *Chaerefolium cerefolium* L., and *Radiola Radiola* L., but not *Volvaria volvacea, Kandelia Candel, Nasturtium Nasturtium-aquaticum, Radiola Radiolaris, Cuminum Cyminum* L., and *Brownea Brunonis.*

It may be observed here that zoologists have already removed the ban on tautonyms, even on absolute ones, and that the admission of absolute tautonyms as legitimable valid names would simplify much the procedure prescribed for new combinations.

15. Linnean Genera (Arts. 20 and 42)

Art. 20 has the following note on the genera in Linnæus's *Species Plantarum:*

"It is agreed to associate generic names which appear in Linnæus's *Species Plantarum* ed. 1 (1753) and ed. 2 (1762–63) with the first subsequent descriptions given under those names in Linnæus's *Genera Plantarum,* ed. 5 (1754) and ed. 6 (1764)".

From this one might conclude that, though the two editions of the *Genera Plantarum* are respectively later than the two first editions of the *Species Plantarum,* the ed. 5th and ed. 6th of the *Genera Plantarum,* are to be regarded for the purposes of Arts.

41 and 42, as having been published simultaneously with the two editions of the *Species Plantarum*, and that the genera described in the 5th edition of the *Genera Plantarum* are to be given precedence over those in the 6th edition. Since, except in the case of *descriptio generico-specifica* (Art. 43), a genus is not validated by a description or mention of the included species (Art. 41), this would also mean that a generic name like *Cycas* used in the two editions of the *Species Plantarum*, but not described in either of the two editions of the *Genera Plantarum*, will have to be regarded as invalid.

But from the note made in Art. 42 this does not appear to be the intention of the legislators. The note runs as follows:

"An exception is made for the generic names published by Linnæus in *Species Plantarum* ed. 1 (1753) and ed. 2 (1762–63), which are treated as having been validly published on these dates."

This would mean that Linnæus's genera in *Species Plantarum* ed. 1 and 2, have to be interpreted with regard to the species described in those two books, in which case the generic descriptions in *Genera Plantarum* ed. 5 and 6 could be taken as giving only clues to the correct interpretation of the genera. Should there be a divergence between the descriptions given in the Genera Plantarum and those indicated by the species or by the lectotype species adopted under the Rules, then the descriptions of the species should alone be taken as decisive, no changes in the conception of the Linnean genera or in the lectotype species being allowable on the basis of the Linnean generic descriptions.

16. Orthography of Names (Rec. XLIII)

This note is provoked by the following remarks made by Dr. A. B. Rendle in the review of the late Dr. A. S. Hitchcock's *Manual of the Grasses of the United States:* "And why does Dr. Hitchcock who is a leading supporter in America of the International Rules of the Botanical Nomenclature, desecrate personal trivial names with a small letter?" (*Journ. Bot.* LXXIV, 1936, p. 29).

In the first place the regulation regarding the use of a capital letter for personal trivial names is embodied not in a Rule but in a Recommendation, so that the use is not an obligation. The recommendation reads as follows:—

"Specific (or other) epithets should be written with a small initial letter, except those which are derived from names of persons (substantives or adjectives) or are taken from generic names (substantives or adjectives). Examples: *Ficus indica,*———— *Lythrum Hyssopifolia, Brassica Napus,*————".

At first the recommendation seems very simple; yet on a closer examination it will be found that the recommendation, besides being very illogical, is also extremely difficult to follow.

Logically one cannot write *Napus* in *Brassica Napus* L., *Hyssopifolia* in *Lythrum Hyssopifolia* L., and *Radiola* in *Linum*

Radiola L. (the last is mentioned in the example under Art. 69 of the Rules) with initial capital letter because all the species concerned are Linnæus's, who did not use any of these names for a genus. They were raised to the generic status long after Linnæus: *Napus* in 1829, *Hyssopifolia* in 1852, and *Radiola* in 1788. They may have been used as generic names before Linnæus, but under the Rules such names are invalid. If made valid especially for the purpose of following this recommendation, then practically all vernacular names, deprived of their qualifying adjectives, would also become valid for the purpose, because they are also generic names, though not in the Linnean sense. In fact, Linnæus wrote with the capital letter all vernacular names used as trivial epithets, but in the Rules such names are printed with a small letter, *e.g. Gluta Renghas* L. in Art. 70.*

But even when cases like those mentioned above are excluded, the Recommendation is still difficult to follow. The specific name say *Victoria* or *Victoriana* has, according to this recommendation, to be spelt with a capital letter, if it refers to the Queen or a lady named Victoria, and with a small letter if it refers to a place. This means that a botanist who wishes to follow this recommendation faithfully, will have to waste a good deal of his time in looking up the original references, and even then he might find the matter not easy to decide upon, because in the original reference the derivation of the name is not clearly stated. A rather lengthy list might be made of such names as are applicable at the same time equally to persons and to places.

Then a doubt arises whether such names as *Princei, Connaughtii,* etc. should be spelt with a capital when they are taken not from personal names but from titles *e.g.* Prince Albert, Duke of Connaught, etc. Further why should the supporters of the recommendation not begin with a capital letter such names as *van-Steenisii, van-Houtteana, von-Muelleri,* etc.; and again why include a capital in the middle of such names as *MacArthurii, MacDonaldiana,* etc.? Under the recommendation *Van-steenisii, Van-houtteana, Von-muelleri, Macarthurii, Macdonaldiana,* etc. (with or without the middle dashes) should be the correct latinized epithets.

All this shows that the recommendation is contrary to the spirit of the Rules which contains the following remarks in Art. 2:

"The recommendations deal with subsidiary points, their object being to bring about *greater uniformity and clearness* in future nomenclature: names or forms contrary to a recommendation cannot on that account be rejected, but they are not examples to be followed". (italics are mine).

Hence this recommendation, which proposes to introduce into the Rules an element of illogical diversity, and of arbitrari-

* New amendments recommend the use of capitals for epithets derived from vernacular names also, but do not consider the faults in Rec. XLIII.

ness, at the sacrifice of simplicity and uniformity, should not have been adopted by the legislators even as a Recommendation.

No wonder, therefore, that such staunch supporters of the Rules as the late Dr. Hitchcock are found to disregard the recommendation for the adoption of a capital letter for certain trivial names and to use a small letter uniformly for all, a procedure that has also the approval of practically all non-botanical systematists, and that is being logically followed by the majority of American botanists.

17. Validating a Name by Referring to a Misapplication

There are cases where botanists have looked upon misinterpretations of a species as constituting valid but illegitimate homonyms. This faulty view has apparently had its genesis at a time when the type-basis concept was not generally accepted, while the faulty way of referring to a misapplication has been mainly responsible for making it widely current amount botanists and for obscuring the actual difference between a misapplied name and a homonym.

But now that the type-basis concept has been made obligatory in modern plant-nomenclature, there is no reason whatsoever why misapplications should be confused with homonyms, even in the manner of referring to them in literature. Thus to cite *Tsuga Mertensiana* (Bong.) Sarg. for *T. Mertensiana* (Bong.) Carr. *sec.* or *emend* Sarg., or *T. Mertensiana* Carr. for the misapplication Carrière made in transferring *Pinus Mertensiana* Bong. to the genus *Tsuga,* has been declared irregular by the last Congress (1935).

Fortunately, however, whenever a misinterpreted specimen has been found to be a new species, botanists holding the erroneous view have not tried to validate the new species by merely referring to the misapplication; but in every case I have seen they have included at least either a valid description for their new species or a reference to a validable figure.* Were it not for the description, or the reference to the figure, the new binomial would have been a nomen nudum, even if the references to misinterpretations contained descriptions applicable to new species; for all misapplied descriptions, however detailed, are intended by their author to be nothing but complementary or

* After writing the above, I came across Rendle's "*Gonolobus jamaicensis* nom. nov." (Journ. Bot. LXXIV, Dec. 1936, p. 345) which is a *nomen nudum,* as it is based on the misapplication *G. rostratus* (Vahl) Roem. et Schult. by Schlechter (Urb. Symb. I, p. 284), i.e. on *G. rostratus* (Vahl) Roem. et Schult. *sensu* Schlechter *partim,* excl. specimen typicum. Rendle himself has not given any description of the species, nor has he referred to any validable description or plate, though he has indicated the type. A name accompanied by an indication of the type but not by a description or by a validable reference, is not admitted as valid under the Rules, *e.g.* several names in Wallich's *Catalogue.*

supplementary to the existing descriptions of their misapplied name, and therefore they do not change the type of the misinterpreted species, nor even do they succeed in changing the status of the misapplied name so as to make it a new homonym. All that these misinterpretations do is to mislead some botanists as to the exact identity, and the range of distribution, of the species.

Since a misinterpretation creates neither a new name, nor a new type, that can be called its own, it cannot be called a homonym, which has both a name and a type of its own. And since, according to the type-basis concept, no one is obliged to consider the specimens wrongly cited under a species, even when these specimens have formed the basis of a detailed misinterpreted description, it follows that one is not bound to look up references to misinterpretations or to miscited specimens, unless the misdetermined specimens or figures are made the types of an original description of a new species. In the latter case it is not the reference to a misinterpretation, but the fresh description given of the specimen or the figure under the new specific name, that transforms the specimen or the figure into the type, irrespective of any amount of references to its previous misinterpretations or miscitations. Similarly in the case of a validable figure, it is the reference directly to it, rather than to any of its previous misinterpretations, that validates the description of a new species and makes the figure the type of the species.

Thus *Calophyllum Jacquinii* Fawcett et Rendle (Fl. Jam. V, 1926, p. 200) is validated not by references given under it to the various misinterpretations of *C. Calaba* L. *sensu* Jacq. (Sel. Stirp. Amer. 1763, p. 269), but by the several plates quoted under it and by the original description given by the authors. It is right in this case to consider *C. Jacquinii* not as nomen novum (as regarded by the authors) but as a species nova, and therefore to look upon all the specimens cited by the authors as its syntypes. Had *C. Calaba* in Jacquin's work (Sel. Stirp. Amer. 1763, p. 269) been a later homonym of *C. Calaba* L. (1753), then *C. Jacquinii* Fawc. et Rendl. would have been a new name so that its syntypes would have consisted of the syntypes of Jacquin's species only, and not any other plate or specimens cited by Fawcett and Rendle.

However *Clerodendron nutans* Wall. *ex* Don, Prodr. Fl. Nepal (1825) 103 and *C. nutans* Wall. *apud* Hook. in Bot. Mag. (1831) t. 3049 are to be regarded not as two different misinterpretations, but as two different homonyms, of *C. nutans* Wall. *ex* Jack in Malay. Misc. I, part 1 (1820) 17, for they were all published independently of each other. It is true that in each case the author tried to interpret Wallich's manuscript species, but manuscript species and manuscript types have no status in modern systematic botany so that a botanist, who wishes to validate a manuscript species, is free to choose any type he pleases. Hence the type of *C. nutans* Jack (1820) [I prefer this formula to *C. nutans* Wall. *ex* Jack, which is recommended under the Rules] is a Penang specimen that was not seen by Wallich, that of *C. nutans* Don (1825) is a specimen from Wallich's collection from Assam studied by Don, and of *C. nutans* Wall. (1831) is Wallich's specimen described in Bot. Mag. t. 3049 which might be one of the specimens listed in Wallich's Catalogue no. 1793 [The specimen figured in the plate is different and was not seen by Wallich]. It might be noted here that *C. Jackianum* Wall., Cat. (1828) n. 1794

is an absolute synonym of *C. nutans* Jack (1820), although Wallich intended to apply that name to a species represented by a specimen he had collected in 1822 in Penang and distributed under n. 1794. This specimen cannot be included as a syntype of *C. Jackianum* Wall. because the binomial was validated by citing *C. nutans* Jack. as its basinym.

If, on the other hand, this way of reasoning is not accepted and it is allowed to validate a new species by referring to a case of a misinterpretation or misapplication without the type specimen and the type description of the misinterpreted species, then it would follow that one could validly publish by citation more than one new binomial by referring not only to more than one misinterpretation of a single species, but also to different elements originally included under one and the same species.

Thus supposing two different elements were included in *Pinus Mertensiana* Bong., one of them would be the type (=lectotype) of the species and the other a case of simultaneous misapplication of the name. One new binomial, *Tsuga Mertensiana* (Bong.) Carr., would be valid by citing its basinym, *P. Mertensiana* Bong. quoad specimen lectotypicum, and the other, say *T. Bongardii* nom. nov., by quoting its basinym, *P. Mertensiana* Bong. excl. specimen lectotypicum. This means that compilers of such works as *Index Kewensis* would have to list every single case of misapplication because it would in effect be equivalent to a homonym, thus defeating the very purpose for which the works came into existence. Herbaria all the world over would also be burdened with the responsibility of bestowing as much care on the miscited specimens as they bestow on the type specimens.

It must be noted here also that misinterpretations come neither under the category of such names as are accompanied with valid descriptions but are invalid because of some faults in their names [cf. Invalid species of Class III (1–3)], nor under the category of the species which, though recognized as new and accompanied with valid descriptions, are published without any name of their own (cf. Class IV). Taxonomic groups of the latter categories (nameless or with invalid names) differ from misapplications in that they are published as new and are accompanied with valid descriptions which are based on their own types, and, unlike misapplications, are not attributed to earlier valid names. Had such groups been given each a validable name, then the name would have been accepted as valid in botanical nomenclature. Long usage, and also the new Rules, has made it possible to validate names by referring to the descriptions of the taxonomic groups of these two classes. Thus *Arenga Griffithii* Seeman (Pop. Hist. Palms, 1856, p. 61) has been validated by a reference to a valid description published without any name by Griffith in Palms of British India, 1850. p. 168. (*See* also Section 19).

18. Citation of Misapplications of Names

The current practice of citing misapplications of names or cases of misinterpreted species is very unsatisfactory. It makes no distinction whatsoever between a misapplication and a true synonym or a homonym. Despite the lively discussion reported to have occurred at the last botanical Congress (1935) on the necessity of adopting a clear procedure for citing misapplications, the point was unfortunately left undecided. Some think that misapplications are better left out altogether from the synonymy of a species, and a proposal to that effect was even suggested at the last Congress. The principal reason for adopting this attitude by some botanists is, I think, that they find the present way of citing misapplications very vexatious and misleading, and also because no good way has so far been suggested for distinguishing between actual synonyms and misapplications. And yet references to misapplications are very necessary to show how the views of one botanist differ from another, especially in the case of misapplications which, owing to the great influence of the botanist who first misapplied them, have become widely current among systematists in general. In view of this I take this opportunity to make some suggestions on the matter, or rather to defend the procedure I have been following for some time.

During the discussion at the last Congress, it was pointed out that to cite "*Pinus inops* Ait. *sensu* Bongard; non Ait." would seem "sheer nonsense", since a species cannot be Aiton's and not Aiton's at the same time. But in my view to cite "*Pinus inops* Ait. *sensu* Bongard" leaving out the misleading phrase "non Ait.", would make sense, since it would mean that Aiton's binomial *Pinus inops* was taken in a different sense, misapplied or wrongly interpreted by Bongard. As the Rules have expressly recommended the use of such particles as *ex, in, apud* and *secundum* in order to show clearly the authorship or the interpretation of certain species, I do not see any reason why the use of *sensu* should be condemned in citations which, without its use, would cause much trouble and nuisance to botanists. The following two examples will illustrate my view on the matter:

(1) *Hedyotis monocephala* Hook. f., Fl. Brit. Ind. III (1880) 63, non Miq.

(2) *Hedyotis connata* Merr., Enum. Philipp. Pl. III (1923) 496, non Hook. f.

At first sight the reader might assume that both these binomials are later homonyms, and, therefore, they are to be rejected; but this interpretation is true only in the first case, the second being an example of a misapplication. To avoid such a conclusion, or to save the reader the trouble of consulting the original references in order to find out what the author actually means by his citations, I adopt the above manner for citing only

homonymous names, using *sensu* to indicate misapplications. Thus :

"*Hedyotis monocephala* Hook. f., Fl. Brit. Ind. III (1880) 63, non (or nec, haud, not, etc.) Miq."

would mean that Miquel and Hooker are separately authors of two different species, but both bearing the same name. If a botanist wishes to say that Hooker's species is a later homonym, he has only to add the year (1869) after Miq., and any reader would at once understand what is meant. Similarly if Miquel's name had been neglected by botanists in favour of Hooker's and one wanted to emphasize the fact that legitimately Hooker's binomial had no precedence over Miquel's, it could be done thus :

"*H monocephala* Miq., Ann. Mus. Bot. Lugd. Bat. IV (1869) 225, non Hook. f. (1880)".

I cite a misapplication thus :

"*Hedyotis connata* Hook. f. *sensu* Merr., Enum. Philipp. Fl. Pl. III (1923) 496".

while I would have cited the species as :

"*H. connata* Hook. f., Fl. Brit. Ind. III (1880) 62, non *sensu* Merrill (1923)".

if I considered Merill's interpretation as erroneous but widely accepted and, therefore, wanted to warn the reader against following it. In practice, however, the last procedure need not be used unless the references have to be very limited. Where there is some latitude for giving references, once can always exclude a misapplication by showing what portion is excluded from, or included in, it, thus :

"*Hedyotis connata* Hook. f., Fl. Brit. Ind. III (1880) 62 ; Merr., Enum. Philipp. Pl. III (1923) 496 quoad specimen Wallichianum" or "excl. specimina malesiana".

But in the case of misapplications where the type specimens are to be excluded, the use of the word *sensu* in the manner indicated above makes the statement both concise and explicit.

However this is not the only way of citing misapplications clearly; and other ways may occur to readers. But such formulæ as

Hedyotis connata (vix Hook. f.) Merr., Enum. Philipp. Pl. III (1923) 496.

and

Hedyotis connata Merr., l. c. p. 496, vix Hook. f.

are not recommendable, as they are also confusing like the previous ones discussed above. (*See* also Section 19).

19. Nomenclatorial Expressions

The argument of the preceding sections 17 and 18 rests on the principle that a taxonomic name is a nomenclatorial expression the meaning of which is not self-evident. Taxonomists therefore must agree upon the way in which a nomenclatorial expression is to be expounded, *i.e.* its denotation and its

connotation, in order to prevent ambiguity. A nomenclatorial expression should, in fact, have the exact significance of an algebraic expression. But however obvious this principle may be and however explicit the Recommendations in the Rules, the fact remains that the same class of nomenclatorial expression may carry a different meaning not only in the works of different botanists but in the works of the same botanist.

The meaning of a nomenclatorial expression is dual: it denotes a certain kind of plant, and it connotes the class of the expression and its author, and/or the opinion of one or more botanists. The denotation has recently been fixed by adoption of the type-concept. It is the connotation that is uncertain and, if this is not remedied, there will be great confusion. The following example will explain the point:

The taxonomic name *Podocarpus javanicus* Merrill is a nomenclatorial expression of the binomial class at the first intent. Therefore it should connote that that species of *Podocarpus* was first described or validly instated by Merrill. But such an expression is also used to connote:

(*a*) a binomial of the second intent, that is, one that has been transferred from one genus to another, *e.g. Agathis alba* Foxworthy (=*Dammara alba* Lam.), *Artocarpus champeden* Spreng (=*Polyphema champeden* Lour.).

(*b*) a misidentification or misinterpretation of the species of one author by another, the name of the second author being attached to the binomial of the first, *e.g. Hedyotis connata* Merr. is a misinterpretation by Merrill of *H. connata* Hook. f.

(*c*) an interpretation of the species of one author by another whether rightly or wrongly, with or without proof, but in the absence of exact denotation by a type specimen, *e.g. Bridelia monoica* Merr. is Merrill's interpretation of *Cluytia monoica* Lour.; *Calamus usitatus* Merr. and *C. usitatus* Becc, are respectively Merrill's and Beccari's interpretations of *C. usitatus* Blanco.

All these three uses are common. Uses *b* and *c* mean that one is permitted to make any number of homonyms on a basinym according to the number of botanists who have made wrong identifications, or different interpretations, of the original species; yet all these homonyms are invalid.

Actually *Podocarpus javanicus* Merrill connotes a misidentification of *Podocarpus javanicus* (Burm. f.) Merr., which is a binomial of the second intent based on *Thuya javanica* Burm. f. and identified by Merrill with *Podocarpus imbricatus* Bl.

I consider that the more usual nomenclatorial expressions should have the meaning I give below. These expressions may be subdivided into two main classes: (*A*) Expressions that denote a taxonomic group and connote the class of the taxonomic name, and the author who first described it; and (*B*) Expressions that, in addition to the previous meaning, connote either an interpretation given to the name, subsequent to the original description, and the author of this interpretation; or the specimens that have to be retained or excluded under the later interpretations. Under (*C*) I have included both those expressions which connote the person through whose offices an author secured the validation of his expression, and his description of it, and those expressions which I consider misleading.

The expressions of the class (*A*), though they need not indicate the type, must be interpreted according to the type, even when there are grave errors in the description given and in the specimens cited. If no type has been designated in the original description, or if it is not extant, then the species must be typified and the errors excluded (*see* Section 13). Expressions of the class (*B*), referring to errors in description or citation, cannot constitute a valid description or a valid name, because a name or a description with its type excluded is inadmissible in botanical nomenclature. In fact the use of nomenclatorial expressions to indicate errors and exclude types seems to be an anomaly, but since they serve a useful purpose in showing the portions excluded from a mixtum compositum and those retained as the lectotype, I think no harm is done by retaining their conventional use in botanical nomenclature, provided any chance of their being confused with other expressions is elimated. However it must be understood that, since such names indicate errors in description or citation, they cannot be used for validating a new name or a new nomenclatorial expression (*see* Section 17).

Class A:

1. *Juniperus silvestris* Roe denotes a certain species of plant and connotes a new taxonomic binomial described by Roe. Here the type is the specimen or the plant studied by Roe.

2. *Thuya silvestris* (Roe) Doe denotes the same species, and connotes two ideas, namely, a taxonomic name originally published by Roe, but later transferred to another genus by Doe. The type here is the specimen or plant studied by Roe.

3. *Thuya silvestris* Doe denotes a certain species described by Doe and connotes that the new name was given to the species by Doe. Here the type is the specimen or plant studied by Doe.

Class B:

1. If *J. silvestris* Roe was a mixtum compositum (positive), the resolution of the species into various components, or the

subsequent correction of it by other authors, may be indicated thus :

(*a*) *J. silvestris* Roe *quoad specimen lectotypicum* = *J. silvestris* Roe *emend.* Doe = *J. silvestris* Roe *sensu restricto* = *J. silvestris* Roe.

(*b*) *J. silvestris* Roe *excl. specimen lectotypicum* is merely a conventional expression to indicate the element that had introduced errors in the original description and citation of the species. It has no valid taxonomic or nomenclatorial status.

2. If *J. silvestris* Roe was not a mixtum compositum, but had been subsequently misinterpreted by Doe, then

J. silvestris Roe *sec.* or *sensu* Doe = *J. silvestris* Roe *quoad interpretationem Doeanam et excl. typum.*

A description given by Doe, cannot be considered as valid in taxonomic botany because, according to the type-basis concept, a description must be interpreted by its types, and the very fact that Doe gave his description under *J. silvestris* Roe means that he tacitly admitted Roe's type as the type of his description. The above expression therefore indicates the errors that were introduced by Doe, and so a new name cannot be validated merely by referring to *J. silvestris* Roe *sensu* Doe. (*See* also Section 17).

3. If *J. silvestris* Roe *emend.* Doe was the basinym of *Thuya silvestris* (Roe) Doe, then this fact may be expressed thus :

Thuya silvestris (Roe *emend.* Doe) Doe.

4. If this emendation was done by Doe after he had made the combination and not previously or simultaneously, then the expression to indicate this fact is

T. silvestris (Roe) Doe *emend.* Doe (= *T. silvestris* (Roe) Doe *quoad specimen lectotypicum.*).

5. If Doe, in transferring *J. silvestris* Roe to *Thuya,* had misinterpreted it, then according to the Rules, *T. silvestris* (Roe) Doe must be interpreted according to the type of its basinym *J. silvestris* Roe. The elements of this misinterpretation can be resolved thus :

(*a*) *T. silvestris* (Roe) Doe *sensu typico, originali* or *basynimico* = *T. silvestris* (Roe) Doe *quoad basinym* = *T. silvestris* (Roe) Doe = *J. silvestris* Roe.

(*b*) *T. silvestris* (Roe) Doe *excl. basinym* = *T. silvestris* (Roe) Doe *pro parte non-typica,* non *J. silvestris* Roe.

The latter has no valid status in taxonomic botany.

6. If *Juniperus silvestris* Roe is a polymorphous species, then

(*a*) *J. silvestris* Roe *sensu stricto* = the type form.

(*b*) *J. silvestris* Roe *sensu lato* = both the type and other forms.

7. If *J. silvestris* Roe was a negative mixtum compositum, and if one were to follow Doe's interpretation of it, without being sure whether or not Doe had made any good case for his interpretation, then this idea could be expressed thus:

J. silvestris Roe *teste/fide* Doe.

Class C:

Other expressions used by authors, or recommended or prescribed in the Rules.

1. ILEX (Tournefort) Linn. is a misleading expression for ILEX Linn., though the former is according to the Recommendation XXXII. Here the genus need not be interpreted with reference to Tournefort's genus at all, the latter being pre-Linnean and invalid. ILEX Linn. must be interpreted after the plant studied by Linnaeus and not Tournefort.

2. *Scindapsus argyræus* Hort. *ex* Engler is a misleading expression for *S. argyræus* Engler, as the application of the name by Engler may prove to be quite different from one that was current among the horticulturists of the time. The former expression is prescribed in the Rules (Art. 48), though the latter is also permitted.

3. *Clerodendron nutans* Wall. *ex* Jack is a misleading expression for *C. nutans* Jack. It is true that Jack adopted the name given by Wallich to plants in herbarium or in the garden, but the plant to which Jack reserved the name might be different from the one to which Wallich had given it. Here the type is the specimen studied by Jack and not the one studied by Wallich. The first expression is prescribed in Art. 48 of the Rules, though the second one is allowed whenever an abbreviated form is desired.

4. *Anodendron manubriatum* (Wall.) Merrill is a misleading expression for *A. manubriatum* [Wall. ms. nomen nudum] Merrill = *A. manubriatum* Merrill. The first two expressions seem to be the natural extension of the procedure of the Recomm. XXXII, though the third is the correct expression for the plant. The type is the plant studied by Merrill and not one studied by Wallich.

5. *Clerodendron nutans* Wall. *in* Don means that the name and the description of Wallich was published in a work or a paper edited by Don. If the author of the nomenclatorial expression is the same as the editor, then omit both the word *in* and the editor's name. But this *in* cannot be omitted if the work

edited by Don is a periodical, though often in such cases the editor's name may be omitted. (*vide infra*).

6. *Clerodendron nutans* Wall. *apud* Don means that Wallich is the author of the name and the description published in a monograph, or a revision, prepared by Don. Don may have concurred with Wallich's opinion and therefore allowed Wallich the credit of his work; but still Wallich alone must be considered as the author of the species. If Don had also added some citations to the ones given by Wallich, they must be excluded from the consideration in typifying the species.

N.B.—The use of these two words *in* and *apud* is not very clearly stated in Art. 48 of the Rules. Thus in the case of *Viburnum ternatum* Rehder in Sargent, *Trees and Shrubs* II (1907) 37, Sargent is considered as a part of the title of the book, whereas from the treatment it appears to be the name of the author, or of the general editor, of the book, Rehder being a contributor to the work. The following three examples will illustrate the distinction I have made above: (*a*) *Iguanura brevipes* Hook. f. *apud* Beccari et Hook. f., Palmeæ *in* Hook. f., Flor. Brit. Ind. VI (1892) 416, or merely *I. brevipes* Hook. f., Flor. Brit. Ind. VI (1892) 416. (*b*) *Iguanura parvula* Becc. *apud* Becc. et Hook. f., Palmeæ *in* Hook. f., Flor. Brit. Ind. VI (1892) 417 or *I. parvula* Becc. *in* Hook. f., Flor. Brit. Ind. VI (1892) 417, (*c*) *Globba Gibbsiæ* Ridl. *in* Gibbs, Contrib. Flor. Mount Kinabalu *in* Journ. Linn. Soc., Bot. XLII (1914) 162, or *G. Gibbsiæ* Ridl. *in* Journ. Linn. Soc., Bot. XLII (1914) 162.

20. Nomina Specifica Conservanda

The enforcement of the priority principle and the type-basis concept is causing radical changes in the popular nomenclature of some plants. But this is inevitable since certain adjustments have to be effected so that, in order to conform with the Rules, all misapplications and all illegitimate names may be rejected without any regard to the influence and position of the botanists who put these misinterpretations and illegitimate names in circulation. In complying with these provisions we support the laws that have been made with the express purpose of bringing about ultimate simplicity, uniformity and definiteness in plant nomenclature.

But time is needed in order to discover all misapplications and illegitimate names; and to do this work satisfactorily a thorough research in the types and also a monographic revision of the plants concerned, not in regard to one small region, but of the entire area where they and their allies occur have to be undertaken so that one and the same species may not receive different names in different regions or political countries. It is natural, therefore, that a work of such vastness is not to be done haphazardly, nor by one or a few botanists. Normally the more

botanists work and try to specialize in families and genera in co-operation with field workers and plant collectors, the shorter will be the time to reach the goal envisaged by the enforcement of the two principles mentioned above.

There are several cases yet to be investigated of the nature of *Raphidophora silvestris* (Bl) Engl., *R. Wrayi* Hook. f., and *R. nigrescens* Ridl. mentioned above (p. 234), where the species, which in the three different regions passed as three different species, are actually only one. In this case the botanists and others concerned in two of the countries will have to adapt themselves to the changes in the nomenclature of the species, despite the popularity of the rejected names. Then there are cases where opinions are not agreed over the identity of species or over the limits of taxonomic groups. In such cases it is but natural that the legitimate name of one botanist should become illegitimate for another. To prevent such oscillations in names is impossible unless legislation is passed fixing the limits of the taxonomic groups concerned and preventing any difference of opinions on the matter. Such a legislation is not within the province of the nomenclature laws which, being concerned only with the names, leave the delimitation of taxonomic groups to the judgement of the individual botanist; and, if actually passed, it would be tantamount to forcing the taxonomic opinions of one set of botanists on another and to hindering the progress of the taxonomic science.

And yet in a Memorandum submitted at the last Congress supporting a proposal for nomina specifica conservanda we read many unjust criticisms against unavoidable changes and against systematists in general, as if systematists effect these changes out of sheer pleasure. The criticisms also reveal a misapprehension as to the actual state of affairs.

One critic for instance, writes: "Foresters greatly resent the changing of names of well-known forest trees without any reference to the persons mostly concerned" as if the correct application of a name depended upon the views of some particular persons using the names. Another says: "Practically all the evidence of priority must have been ferretted out by botanists by now, and if some obscure references do turn up in future, there should be some limitation". This may be true in some few cases only, especially in case of the native flora of some parts of Europe where systematic studies have been carried on very intensively for a number of generations by botanists who had opportunities to study not only the plants in the field but also the types in the herbarium; but this is not so in the great majority of cases. Besides, the priority principle and type-basis concept have been very recently adopted by botanists and so an intensive study is necessary before all misapplications and synonyms can

be detected. No doubt legitimate nomenclature changes will cause some troubles at present, but in the end the procedure, when worked out in full, is expected to result in stable nomenclature except in species where the status might remain still a matter of taxonomic opinion.

But some people are impatient, and it is this impatience, coupled with inadequate understanding of the results expected from the adoption of the priority principle and type-basis concept, and with the lack of precision in some articles of the Rules, that is, in my opinion, the pricipal reason why some people clamour for nomina specifica conservanda. In fact we read in the Memorandum referred to above that the Inspector-General of Forests to the Government of India has stated the following: "If these motions are not passed I shall have to consider the appointment of a committee to deal with nomina specifica conservanda as far as Indian forestry is concerned, irrespective of what names European botanists may give to our trees".

It is to be feared that, if such a committee ever gets to work in India without any reference to European herbaria where most of the types of Indian plants are preserved, many misapplications will be perpetuated; and, if this is done without any regard to the nomenclature of the plants that also occur both in India and in countries beyond the control of the Inspector-General of the Forests in India, chaos and confusion of vast magnitude will be the result. Besides what guarantee can the Inspector give that a conserved misapplication will not be again misapplied, necessitating another committee decision to satisfy the demands of the future users of the second misapplication?

Judging from the way the name *Rhizophora conjugata* L. (Sp. Pl., 1753, p. 443) was being used only a few years ago both in Asia and Europe, it is almost certain that, if votes were taken then, the name would have been conserved for a plant which Linnæus did not intend, and which should actually be called *R. apiculata* Bl. (1827) with *R. candelaria* DC. (1828) as a synonym. Yet Trimen who was well acquainted in Ceylon with Rhizophoraceous plants in the field and had also examined the type drawing in Hermann's herbarium (apparently the sole basis of the Linnean species), showed that *R. conjugata* L. was conspecific with *Bruguiera gymnorrhiza* (L.) Lam. (1797) (Journ. Linn. Sec. Bot. XXIV, 1887, p. 142). *Rhizophora conjugata* L. as until recently understood and as even now used in some recent Asiatic works, is therefore nothing but a misapplication to be rejected under the Rules in order that its correct name *R. apiculata* Bl. might be used, and in order that *R. conjugata* L. might be retained for the plant for which Linnæus had published the name. If now because of some trouble that may be caused to Indian foresters, the Inspector-General's committee retains the Linnean name for *R. apiculata* Bl., then there will be three

names, *R. conjugata* L. *sensu* the Inspector-General's committee, *R. conjugata* L., and *R. apiculata* Bl. current for two plants.

It is almost certain that the nomenclature of the Indian forestry department will not be followed by systematists and other workers not only in Europe and America, but also in Malaya, Indo-china, Netherlands Indies, Philippines, Formosa, China, etc., and perhaps even by systematists in India itself. In the end it might be found that no one, outside the Indian forestry department, would be able to follow the plant nomenclature adopted by the Indian foresters, unless a detailed synonymy were given; and conversely the Indian foresters might not be able to keep in touch with the work that is being done by persons not connected with the Indian forest department but in subjects concerning Indian forest plants. Thus the work of the Inspector-General's committee might hinder rather than aid the progress in the knowledge of the Indian plants themselves.

In my view, therefore, the time is not yet ripe for proposing a list of nomina specifica conservanda. Some time is necessary so that the nomenclature that was in use may be adjusted to the principles of priority and the type-basis concept adopted by the Rules. Detailed investigations are, moreover, necessary in order that misapplications may be detected. Further the methods proposed for interpreting a mixtum compositum or for rejecting nomina ambigua and confusa have also to be worked out. It is only when these methods and investigations have failed to make the nomenclature stable that the nomina specifica conservanda could be undertaken, if actually desired. Otherwise an adoption of a nomina specifica conservanda would mean the perpetuation of errors circulated through careless work and the discouraging of thorough investigations in systematic groups; it would mean that any influential groups of botanists could circulate any amount of misinterpretations and, should anyone less influential but more careful contest the interpretations on the basis of the types, the former could resort to votes in order to perpetuate their misapplications by means of legislation. In the end we may get the Congress degraded into a sort of political parliament where parties would meet, each with the intent of defending, right or wrong, an interpretation proposed by its members.

Instead of trying to influence the botanical nomenclature of Indian plants of forestry importance, it would be better if the Inspector-General of Forests were to use his weight in order to develop the vernacular nomenclature of the plants to be used both by the members of the different forest departments under his charge and by the traders interested in the Indian forest products. Such an attempt might in the long run bring about more clearly certain differences among the species that are now imperfectly known, and thereby might help botanists to clear the status of the species concerned.

21. Effectiveness of Advance Separates

Article 36 of the Rules of Botanical Nomenclature deals with the conditions regulating the effectiveness of a systematic publication, and it reads as follows:

"Publication is effected, under these rules, by sale to the general public or to botanical institutions, of printed matter or indelible autographs, or by distribution of these to specified representative botanical institutions.*

"No other kind of publication is accepted as effective: communication of new names at a public meeting, or the placing of names in a collection or gardens open to the public, does not constitute effective publication."

But at the last Congress (Amsterdam 1935) there was added to the foregoing Art. 36 a further clause, which reads as follows:

"Where separates from periodicals or other works placed on sale are issued in advance, the date on the separate is accepted as the date of effective publication." (Proceedings I, 1936, p. 343).

Now this additional clause is so worded that, I suggest, it makes it possible to secure effectiveness for a publication in a way which the foregoing text of Art. 36 was meant to prevent. It weakens and lessens the effectiveness of the text by not making it obligatory for the authors of separates to distribute these to any specified persons or institutions, a distribution which, in the original text, is the alternative to placing the printed matter or indelible autograph on sale. The effect of the clause is to encourage the printing of works in parts but the distribution only in completed volumes; and yet, because of the separates issued in advance, to legitimize the claim to make the date on the parts or separates (and not the later date on which the volumes were distributed) as the date of their effective publication.

Already the existence of this practice of distributing some institutional publications in volumes, instead of in parts as and when issued, is causing much confusion and inconvenience even to the institutions which maintain an exchange with, or subscribe to, such publications; in as much as the latter institutions are prevented from keeping in touch with the recent advances and progress in systematics of the countries in which they are most interested, being obliged to wait for the information till the completion of the volumes. There is no fixed period within which a volume of such a periodical might be completed and be made available to the public; and it is not uncommon to find botanists accumulating their separates before finally distributing them, simply in order to save themselves the expense of frequent distribution. As a consequence of this lack of immediate distribution of systematic papers several names may be published which later may have to be discarded as superfluous or illegitimate.

* Only a tentative list has been compiled of the representative botanical institutions to be recognized under this Article, but no final agreement has yet been reached as to the names to be included in this list.

If now, encouraged by this new clause, this practice of distributing departmental publications only in completed volumes and not in parts as issued, or of distributing in one year periodicals dated in a previous year, becomes general, one can well imagine the evil effects of the proposed new rule. What amount of unnecessary inconvenience and confusion would have resulted if the sale of the FLORE GENERALE DE L'INDOCHINE was begun only on the completion of each volume, instead of, as hitherto, on the issue of each fascicule, and yet, because of the separates issued in advance as authors' copies, the validity of the publication was to begin on the date on which each fascicule was printed? Some volumes of this flora have actually taken twenty years or more to complete.

Hence if the work is to be effectively published by means of advance separates, these separates should be regarded as works *not offered for sale,* for such they are in fact; and consequently, the clause governing such works should be made to operate. The mere fact that a work is regarded as an advance separate from a regular periodical *to be placed on sale* should not obscure the fact that these separates, at the time of their issue, were *not placed on sale;* and so they should not be exempted from the rule and be allowed to secure effectiveness in publicity without making the work available to the botanical public, principally to those institutions which are most interested in it. Should some accident or economic upheaval destroy the issue of the periodical or cause it to be suspended before the intended completion of the volume, then the papers issued in advance as separates may never become available for purchase. In such an event there might be all the elements to pronounce the work ineffectively published, though the new modification to *Art. 36* would make its publication effective.

Moreover if the principle is admitted of legitimizing a publication at a date when it is issued for private distribution, what is the use of penalizing others who issue independent works and circulate them in a similar manner, simply because no promise has been made to publish them at a later date in a regular periodical? Again, what if the author of such a private work were to announce in it that he would issue at a later day an edition for the public? Which date should systematists then take for the purpose of reckoning the effectiveness of the publication? For, to say that a certain, privately circulated work is an advance separate of a regular periodical is no more than to promise to publish the work later in the periodical which will be released at an indefinite date. Hence the new clause to *Art. 36* would be applicable in this case and would make the first issue of the work effective.

To anticipate the date of the systematic validity of a work on the expectation of certain events to take place at an indefinite future is, I submit, an undesirable procedure. If the date of the

effectiveness of a publication is to be judged, it should be on the action already taken by its author or publisher to make the work available to the systematic public interested in it, and not on the action that the author or the publisher will take, or has promised to take, at some future day.

If an institution finds difficulty in printing and distributing the results of its research work as it progresses, it could publish these results from time to time in those privately owned periodicals which are only too willing to accept them for publication, and the institution could order reprints from the publishers for the purpose of exchange.

From the foregoing it will be seen that the additional clause as it stands introduces a very disquieting element into the Rules and makes Art. 36 practically valueless. The legislators might have been led to adopt the clause owing to its misleading phraseology, for the clause might be easily mistaken for an amendment to Art. 45, which deals with the dates of effective publications. Had the following proposal been made, its undesirability would have been at once apparent; yet it has the same significance as the clause adopted :

"Publication can also be effected, under these Rules, by means of printed matter or indelible autographs not placed on sale, and not distributed to the specified institutions, if they are regarded, at the time of the issue, as advance separates from periodicals or other works placed on sale, it being immaterial whether or not they are actually reprinted in the periodicals or other works".

However the new clause can be made to conform with the text of Art. 36 by the addition of some such words as the following :

"provided that immediately following the issue of separates they be duly distributed to the specified representative botanical institutions."

22. Representative Botanical Institutions under Art. 36

The discussion held at the last botanical Congress in Amsterdam, though short, showed that the tentative list of the representative botanical institutions prepared by Dr. T. A. Sprague and Miss M. L. Green for recognition under Art. 36 was not satisfactory. To be effective the list should conform : firstly, to the needs of the institutions working in the area about which the papers to be validated deal; and, secondly, to the needs of those institutions which, though not situated in the area, are yet directly interested in the studies of the flora. On the other hand, certain institutions neither want, nor have any place to accomodate, systematic papers concerning regions, in the floristic studies of which they are not even remotely interested. Consequently it would be worse than useless to send such papers to them, as these institutions might destroy the papers immediately on their receipt and without keeping any record.

In order to draw up a satisfactory list, it would seem advisable therefore, to divide the entire globe into about a dozen regions,

which need not necessarily be botanical regions, each having the following subdivisions: (*a*) including the important botanical institutions working in the divisions with which the work deals; (*b*) including the important institutions of the neighbouring countries which may be directly or indirectly interested in the flora of the region; and (*c*) including the institutions which, though situated in countries far away from the regions dealt by the work, are interested in the floristic study of the region, as well as the institutions of those countries which have colonial dependencies in the region.

The total number of institutions thus enumerated should not exceed 20–25, and in no country should more than one institution be named, unless the extra institutions in any single country are sufficiently important to be included under (*a*).

With such a list determined upon, it should be made obligatory for an author, desiring to make his work effective for the purpose of systematics, to send copies of his work to the relative institutions under *a*, *b* and *c*.

In the case of an author's work embracing an area falling in more than one regional group, he should send at least to one of the most important institutions in each country named under (*a*) and (*b*) in the groups affected. This latter procedure would meet the case of the author who might be uncertain into which regional group his work should exactly fall; for example a work dealing with the whole of France or with Himalayan regions, or with Tropical America, or Indo-China. This suggested procedure would oblige authors who wish to describe, in one single paper, new species and genera from all parts of the world, to send their papers to an enormous number of institutions. But botanists who would think of preparing such a work for private distribution only should be thus penalized in the interest of science.

It would be further desirable to make this distribution to the specified institutions through a central committee, which should be responsible so to mark every copy thus distributed that botanists consulting any one of the copies will know at once that the work, though not placed on sale, has been effectively published. Such an obligation would render difficult to pass undetected any future offence against Art. 36. Besides without such a committee to keep a check on this distribution, how is one to know, without making a detailed inquiry, that certain privately distributed work sent to one institution is not sent to others specified under the Rules? In view of the difficulties to decide immediately on this matter, a botanist might be induced to accept an ineffective publication as valid and to make accordingly several nomenclature changes, resulting in invalid names passing not only as valid but even as legitimate. If several years elapse before the mistake is discovered, then the

rejection of the invalid names, though circulated erroneously as legitimate, might be resented because of their being long in use. There is also the possibility of some institutions losing the copies sent to them, and, if the institutions are unable to produce records showing whether they had actually received the copies or not, the loss might vitiate any subsequent inquiry into the effectiveness of the work. All such drawbacks would disappear if the distribution of the publications not placed on sale has perforce to be done through a central committee.

A fourth clause (*d*) could be added by way of recommendation including those large institutions or scientific libraries which, though not actively interested in the flora of the region, are willing to accomodate works for the purpose of making them available to research workers, provided these institutions are not already included in *a*, *b* and *c*.

To illustrate all that I have said above, I append the following tentative list (omitting the considerations of palæobotanists who should have their own separate list) which might form a basis for future discussions :—

I. North Europe

(*a*)	1. Austria	2. Belgium	3. Czechoslovakia	4. Denmark
	5. France	6. Germany	7. Great Britain	8. Holland
	9. Latvia	10. Norway	11. Poland	12. Russia
	13. Sweden	14. Switzerland		
(*b*)	1. Bulgaria	2. Hungary	3. Italy	4. Portugal
	5. Spain	6. Roumania		
(*c*)	1. Canada	2. China	3. India	4. Japan
	5. Palestine	6. U.S.A.		
(*d*)	1. Argentine or Brazil	2. Hawaii	3. Netherlands Indies or Philippines	

II. South Europe

(*a*)	1. Bulgaria	2. France	3. Hungary	4. Italy
	5. Portugal	6. Roumania	7. Spain	8. Turkey
(*b*)	1. Algiers	2. Austria	3. Egypt	4. Germany
	5. Palestine	6. Russia	7. Switzerland	
(*c*)	1. Belgium	2. China	3. Great Britain	4. Holland
	5. India	6. Japan	7. Sweden	
(*d*)	1. Brazil	2. Canada	3. S. Africa	4. Netherlands Indies or Philippines
	5. U.S.A.			

III. North Asia

(*a*)	1–3. China (Canton, Nanking & Peiping)	4. India	5. Japan	6. Palestine
	7. Russia			
(*b*)	1. Alaska	2. Canada	3. Formosa	4. Netherlands Indies
	5. Philippines	6. Singapore		
(*c*)	1. Austria	2. France	3. Germany	4. Great Britain
	5. Italy	6. Switzerland	7. U.S.A.	
(*d*)	1. Brazil	2. Sweden		

IV. South Asia

(*a*)	1. Ceylon	2. Formosa	3. India	4. Netherlands Indies
	5. Philippines	6. Singapore		
(*b*)	1. Australia	2. China	3. Japan	4. New Zealand
(*c*)	1. France	2. Germany	3. Great Britain	4. Holland
	5. Italy	6. Portugal	7. Russia	8. Switzerland
	9. U.S.A.			
(*d*)	1. Brazil	2. Canada	3. Sweden	4. Union of S. Africa

V. Africa

(*a*)	1. Algiers	2. Egypt	3. Tanganiyika	4. Union of S. Africa
(*b*) & (*c*)	1. Belgium	2. France	3. India	4. Italy
	5. Germany	6. Great Britain	7. Holland	8. Portugal
	9. Spain	10. Switzerland	11. U.S.A.	
(*d*)	1. Australia	2. Brazil	3. Japan	4. Netherlands Indies or Philippines
	5. Canada			

VI. Polynesia and Pacific Countries

(*a*)	1. Alaska	2. Argentine	3. Fiji	4. Hawaii
	5. Japan	6. Peru	7. U.S.A.	
(*b*) & (*c*)	1. Australia	2. Canada	3. China	4. France
	5. Germany	6. Great Britain	7. Holland	8. Netherlands Indies
	9. New Zealand	10. Philippines	11. Russia	12. Singapore
	13. Sweden	14. Switzerland		
(*d*)	1. Austria	2. Brazil	3. India	4. Spain
	5. Trinidad			

VII. Australia, New Zealand and Melanesia

(*a*)	1–2. Australia (Brisbane & Melbourne)	3. New Zealand		
(*b*)	1. Formosa	2. Hawaii	3. Netherlands Indies	4. Philippines
(*c*)	1. China	2. France	3. India	4. Italy
	5. Japan	6. Germany	7. Great Britain	8. Holland
	9. Singapore	10. Switzerland	11. U.S.A.	
(*d*)	1. Brazil	2. Ceylon	3. Russia	4. S. Africa
	5. Sweden			

VIII. North America and Greenland

(*a*)	1. Alaska	2–3. Canada (Ottawa & Quebec)	4. Mexico	
	5–8. U.S.A. (Berkeley, Chicago, Harvard, New York or Washington)			
(*b*)	1. Argentine	2. Brazil	3. Chile	4. Equador
	5. Japan	6. Paraguay	7. Peru	8. Russia
	9. Trinidad			
(*c*)	1. France	2. Germany	3. Great Britain	4. Denmark
(*d*)	1. Austria	2. China	3. Holland	4. India
	5. Italy	6. S. Africa	7. Sweden	

IX. *South America*

(*a*)	1. Argentine	2. Brazil	3. Chile	4. Equador
	5. Paraguay	6. Peru	7. Trinidad	
(*b*) & (*c*)	1. Canada	2. France	3. Germany	4. Great Britain
	5. Hawaii	6. Holland	7. Mexico	8. Sweden
	9. Switzerland	10. U.S.A.		
(*d*)	1. Australia	2. India	3. Italy	4. Japan
	5. Philippines or Netherlands Indies	6. Russia	7. Spain	

X. *Arctic*

(*a*), (*b*) & (*c*)	1. Alaska	2. Austria	3. Canada	4. China
	5. Denmark	6. France	7. Germany	8. Great Britain
	9. Holland	10. Japan	11. Norway	12. Russia
	13. Sweden	14. Switzerland	15. U.S.A.	
(*d*)	1. Argentine	2. Australia	3. Brazil	4. Hawaii
	5. India	6. Italy	7. New Zealand	8. S. Africa (Union)

XI. *Antarctic*

(*a*), (*b*) & (*c*)	1. Argentine	2. Australia	3. China	4. France
	5. Germany	6. Great Britain	7. Hawaii	8. Japan
	9. Netherlands Indies	10. New Zealand	11. Philippines	12. Russia
	13. S. Africa (Union)	14. Switzerland	15. U.S.A.	
(*d*)	1. Austria	2. Brazil	3. Canada	4. India
	5. Sweden			

23. Summary

In this paper I have attempted to make clear and precise some rules that were obscure, misleading, or defective.

The greatest fault in the Rules is the equivocal use of the words valid and legitimate and their respective derivatives. As defined here, invalid taxonomic names are those that have no status in modern botanical nomenclature, all those that have such a status being defined as valid.

Invalid names and nameless taxonomic groups can be arranged into four main classes:—

(1) those that are ineffectively published;

(2) those that are published in effective but invalid publications;

(3) those that are published in valid publications, but either containing defects in (*a*) the names themselves, and/or (*b*) their descriptions; or (*c*) consisting of only names without any descriptions; and

(4) those that are published in valid publications and with valid descriptions, but without any names whatsoever.

The present usage allows the validation of a taxonomic name by a reference to a valid description of invalid names in Class 3 and of nameless taxonomic groups in Class 4; also permits references also to plates in publications that are rendered invalid under Art. 20; but the wording of Arts. 37, 42 and 44 of the Rules seems to allow references to descriptions and plates published in any books, even popular and non-botanical books and written in any language, provided the conditions for effectiveness as laid down in Art. 36 are complied with. The Rules have, therefore, to be amended so as to exclude references to such non-botanical publications and invalid descriptions. It would indeed be advantageous to admit in future as valid only references to valid descriptions, and plates, in valid publications, defining valid publications to mean such publications as are effectively published and as ordinarily reach systematic botanists.

Provisional names are invalid because of the defects that make their descriptions invalid. Since one may not validate a name of a taxonomic group by referring to an invalid description, it follows that references to provisional names or to their descriptions are not valid.

Valid names may be legitimate or illegitimate. An author, having defined his taxonomic group and assembled together all the rival names of the group, should consult the Rules in finding out the correct name for his group. Under the Rules it should be possible for only one name to be correct for a given taxonomic

group (*i.e.* a group in a given sense, in a given position and in a given rank) : this name is the legitimate name for the group as defined by the author, all others being regarded as illegitimate for it.

Illegitimate names are cited as synonyms, which may be divided into two classes (1) absolute synonyms, consisting of typonyms, isonyms, and/or basinyms, and (2) equivalent synonyms. A third class of synonyms consists of names doubtfully referred to the species or of names based on monstrosities of the species.

As the present wording of the Rules is obscure and equivocal regarding the procedure to be followed in selecting the legitimate name out of the several rivals of unequal ages, three usages are explained, only one of which will have to be adopted in the Rules.

The difference between a new combination and a new name is explained.

Alternative names are simultaneous isonyms; but those simultaneous isonyms that are not new combinations of equal rank should be prohibited.

The Rules oblige one to follow the botanist who first preferred one of the rival names of equal age and equal rank for one species (Art. 56), and one of the homonymous names of equal age (new addition to Art. 61); but it is necessary to add to both these Articles that this preference holds effective so long as the names remain in the same position or genus under which the choice was made. On the transference of any of the names to another position or genus, the author who first made the distinction in the new position should be followed. But in every case the botanist exercising his privilege under Arts. 56 and 61 should see that a new combination gets precedence over a new name, and this over a new species; and also that, among the homonymous names that are isonyms of equal age and equal kind, the one that has the oldest basinym gets the precedence.

Varietal names given to the type form of a species (as in Rec. XVIII) and retained as varieties of it are equivalent to ternary specific names and cannot have a place in modern plant nomenclature. Examples are given to show that such a procedure may also lead to serious confusion.

When a species is to be divided into two or more species and it is not possible to assign the original description definitely to any of its syntypes, then the first author to choose one of them as the lectotype or to transfer the other specimens to different species should be followed. If the syntypes of a species are not extant and the original botanical description combined with

phytogeographical considerations admit more than one interpretation that is not obviously discordant with the original description, then botanists should be obliged to follow the earliest of the interpretations; or if the species has been previously excluded as doubtful, then the name should not be adopted to any taxonomic group, without any adequate botanical reasons or proofs. In my opinion the time is not yet ripe for making a list of nomina ambigua, dubia vel confusa: suggestions for stabilizing names without such lists should first be given an opportunity to do their work in full.

The Rules regarding tautonyms and homonyms appear to be very confusing. It might be better to frame some general rules without attaching any importance to the meaning and origin of the words, provided serious risks of confusing one name with another are avoided. Suggestions are made showing how this rule could be framed.

Since according to Art. 42 generic names in Linnæus's *Species Plantarum*, eds. 1 and 2, are validly published, the purport of the provision under Art. 20 seems to make the generic descriptions in Linnæus's *Genera Plantarum*, eds. 5 and 6, merely supplementary.

It seems logical to write all trivial epithets with a small initial letter, whether or not they are the names of persons or of genera, or their derivatives.

Misapplications cannot be used to validate new species. It is therefore important to adopt a method of citation which will clearly distinguish misapplications from illegitimate homonyms. It is argued that the use of the word *sensu* for this purpose is a rational one.

A brief discussion on the different kinds of nomenclatorial expressions is introduced in order to further clarify the fundamentals underlying them. Though the use of nomenclatorial expressions to indicate errors seems to be an anomaly, yet their conventional use is retained, as they help to refer to errors both concisely and precisely. But they should be used in the way suggested, so that they might not be confused with expressions that do not refer to errors. It is shown again that expressions referring to errors cannot be used as a basinym of a new name. Expressions with *in*, *ex*, and *apud* are also discussed.

The principle of priority and the type-basis concept have been adopted as universal rules only very recently. Time is therefore needed so that plant nomenclature may adjust itself to these principles. It would be detrimental to the interests of systematic botany if *nomina specifica conservanda* were adopted at this stage.

The additional clause voted to Art. 36 by the last Congress is against the spirit of the article itself, as it will legitimize

practices of securing effectiveness in publication which it is the principal object of Art. 36 to prevent.

A principle is here enunciated by which unanimity and satisfaction might be secured in recognizing representative botanical institutions under Art. 36. Reasons have been adduced to show the need of distributing the copies of a publication not placed on sale through a central committee. A tentative list of these institutions is also given.

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